



# GREEN FINANCE REPORT



2024  
JULY





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*Act CXXXIX of 2013 on the Magyar Nemzeti Bank, the primary objective of Hungary's central bank is to achieve and maintain price stability. The MNB supports the stability of the financial intermediary system, enhancing its resilience, ensuring its sustainable contribution to economic growth and, with the tools at its disposal, the Government's policy on economic and environmental sustainability, without compromising its primary objective of achieving and maintaining price stability.*

*Following the decision of the National Assembly on 28 May 2021, the MNB's mandate was extended to support the Government's policy on environmental sustainability, making it the first EU central bank to be granted a green mandate. Environmental sustainability includes the mitigation of and adaptation to climate change, sustainable use of water resources, transition to circular economy, prevention and reduction of environmental pollution, and protection and restoration of biodiversity and ecosystems. The main objective of the "Green Finance Report" is to provide a comprehensive annual overview of the Hungarian financial sector's exposure to environmental sustainability risks and the financing actions promoting sustainability, as well as the related sustainability programmes of the Magyar Nemzeti Bank.*

*The analysis was carried out under the general guidance of Bálint Balogh, Director, under the coordination of the Sustainable Finance Department. Contributors to the analysis were the staff of the Directorate for Sustainable Finance: Viktória Deák, Norbert Holczinger, Laura Jókuthy, Katalin Juhász, Donát Kim, Nikolett Kovácsné Bóta, Márton Kruppa, Balázs Lóránt, Szabolcs Párkányi, Vivien Pintér, Eszter Raciborski, Renátó Ritter, Balázs Sárvári, Nikolett Tőrös-Barczel, Bálint Várgedő and Vivien Vincze-Pintér. Other contributors were Anna Nóra Sándor and Patrik Tischler from the International Relations Directorate, Ákos Bereczki and Beáta Szabó from the Financial System Analysis Directorate, András Sulyok from the Monetary Policy and Money Market Analysis Directorate, Ágota Rebeka Dévényi from the Structured Finance Strategy Directorate, Éva Bai-Paulik, Marcell Biró, István Balázs Horváth and Dr. Dániel Szabadkai from the Monetary Policy Instruments, Foreign Exchange Reserves and Risk Management Directorate, and László Seregdi Ákos from the Licensing and Legal Enforcement Directorate. Áron Horváth, founder of the ELTINGA Centre for Real Estate Research and Gáborné Székely, Head of the Housing Statistics Department of the Hungarian Central Statistical Office contributed valuable thoughts to the Report. The publication was approved by the Financial Stability Council. The Report incorporates valuable input from other areas of the MNB, from Csaba Kandrács, Deputy Governor for Supervision of Financial Institutions and Consumer Protection, and from the Financial Stability Council.*

*The report has been prepared mainly on the basis of data available as at 31 December 2023. The data with divergent frequencies are updated differently, and therefore the horizon of the analysis may also differ in some cases. The printed version has been produced using the solution with the lowest environmental impact realistically achievable. Please print the electronic version only if justified.*



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# Contents

<b>Foreword</b>	7
<b>Executive summary</b>	8
<b>NGFS Dashboard</b>	10
<b>1 International developments and domestic sustainability</b>	11
1.1 Global comparison	11
1.2 Sustainability of the domestic economy	14
<b>2 Measuring sustainability-related financial risks and negative environmental externalities</b>	19
2.1 Trends in the Bank Carbon Risk Index	19
2.2 Climate Risk Matrix – a snapshot of the Hungarian banking system	20
2.3 Short-term climate stress test	22
2.4 Set minimum standards for the ESG questionnaire on lending	23
2.5 New, regular green data publication	24
<b>3 Green finance: barriers and incentives</b>	26
3.1 Trends in green lending	26
3.1.1 Extension of the Green Preferential Capital Requirements Programme	26
3.1.2 Green Preferential Capital Requirements for housing loans	29
3.1.3 Energy efficiency in the domestic real estate and credit market	31
3.1.4 Sustainability in transport – financing electromobility	34
3.2 Green capital market	36
3.2.1 Green corporate bond market	36
3.2.2 Green government bonds	38
3.2.3 Green mortgage bond issues	41
3.2.4 Stock market, stock exchange	43
3.2.5 Venture capital funds and private equity funds	44
3.2.6 Investment funds	44
3.2.7 Unit-linked insurance and fund portfolios	46

<b>4 National and international regulation and expected changes</b>	49
4.1 Developments in international organisations	49
4.2 NGFS recommendations and related measures by the MNB	56
4.3 International developments in 2023	58
4.4 Domestic developments in 2023	61
4.5 Expected changes to green legislation, recommendations and data reporting	63
<b>5 Academic aspects of green finance</b>	66
5.1 The MNB's education activities in green finance	66
5.2 University research collaborations	67
5.3 Scientific awards and research funding	68
<b>Main acronyms and abbreviations</b>	71
<b>Appendix</b>	72



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# Foreword

*The year 2024 will play an extremely important role in the history of the Magyar Nemzeti Bank, as it marks the 100th anniversary of the founding of Hungary's central bank. The centenary is a good opportunity to look back over the past 100 years and to highlight some of the key changes that have helped us to understand where the central bank has come from and where it is today, using the most important indicators.*

*Perhaps most importantly, since 1924, life expectancy in Hungary has increased from 43.1 years for women and 41 years for men to 79.3 years and 72.9 years, respectively. Fortunately, this improving trend is not unique to our country, but is also worldwide. This enormous success could not have been achieved without the development of the economy. In Hungary, gross domestic product per capita has more than doubled in real terms since 1924. On the international stage, in some countries, such as the UK and the Netherlands, growth was slower than in Hungary and they have seen a four to five-fold increase between 1924 and 2018. In other parts of the world, however, growth has been far more accelerated than in Hungary: in South Korea and Singapore, for example, it has been more than 20 times faster.*

*In many other areas, specific trends could be described which show that economic development has not led, either in Hungary or in most countries of the world, to a more favourable period than the current one. This is true not only for the last 100 years, but also for the period since the birth of civilisation. Access to healthy drinking water and energy (especially electricity), education, the decline in extreme poverty and hunger as well as child mortality are all areas where mankind has taken an enormous step forward both at the global level and locally.*

*But the spectacular results have come at a substantial environmental cost. Economic growth was based on burning fossil fuels, which more than doubled annual carbon dioxide emissions in Hungary between 1924 and 2023, and almost fivefold worldwide. This increased the amount of carbon dioxide in the atmosphere dramatically, causing accelerating global warming. There are concerns that the process is becoming irreversible.*

*Climate change is not the only undesirable global by-product of economic development. Scientists believe we are also witnessing the sixth wave of extinction on Earth. In the last 100 years alone, more than 500 vertebrate species (including the marsupial wolf in Australia and the zebra-like quagga in Africa) have disappeared from the planet, implying a rate of extinction at least ten times faster than the natural rate. Scientists estimate that 1 million of the 8 million animal and plant species we know are threatened with extinction, presaging a biodiversity crisis and, for us humans, an existential crisis due to the risks to food production and health.*

*It is now clear that the economic model we have been pursuing is unsustainable, because further economic and social benefits can only be achieved at disproportionate environmental risk. The good news is that we have potential solutions that work without (or at most with low) carbon emissions and without damaging nature (e.g. renewable energy technologies, regenerative agriculture techniques) and on which a new economic model can be based. A sustainable pathway can be built where economic growth is decoupled from our current practices of emissions, pollution and destruction of nature, and where harmful practices can be reduced.*

*Time is running out, and we have only a few decades, at best, to make this economic model change. Sustainable finance can help speed up the transition. Our publication aims to report on the current state of this field in Hungary. The mission of the Magyar Nemzeti Bank is to support environmental sustainability efforts, in line with the green mandate it received from the Hungarian Parliament in 2021. We are therefore working hard to ensure that in 50 and 100 years' time, when we reach another round anniversary, we will be able to report that our social and economic indicators have improved, while at the same time preserving and enriching the world we have created.*

Dr. György Matolcsy  
Governor of the Magyar Nemzeti Bank

# Executive summary

**Last year we exceeded the global pre-industrial average temperature by 1.48 degrees Celsius, making it the warmest year on record.** Based on researchers' calculations, we have to go back 125,000 years in time to see a year as extremely hot as this one. Due to rising carbon dioxide emissions, we are close to breaching the critical 1.5–2 degrees Celsius Paris target range, and 2024 is projected to be a new record. However, some research institutions see hope that 2024 will be a turning point for greenhouse gas emissions, which would be essential to avoid irreversible existential threats. The optimism comes from investment in the energy transition, but the pace of investment needs to be sustained in the future, for which private sector investment is essential in addition to government resources.

**In line with the EU's climate targets, Hungary's climate policy is also ambitious, as the country has committed to a 55 per cent reduction in GHG emissions by 2030 and to becoming climate neutral by 2050 at the latest.** On the positive side, the GHG emission reductions of Hungary are currently at 41.7 per cent, well above the EU average of 32.5 per cent. In Hungary, as well, the annual average temperature in 2023 has proved to be the warmest on record since 1901; however, it was accompanied by a record number of precipitation and storms. This is a big change from the drought of 2022, and this extreme weather will continue in the future, as Hungary is among the less resilient countries to climate change. Reducing GHG emissions is also desirable from a national economic point of view, as Hungary relies heavily on imports of natural gas and oil, among other things, which increases the country's vulnerability significantly. In conjunction with the Zero Carbon Centre, the Magyar Nemzeti Bank has organised several research projects and conferences on energy efficiency and green electricity, supporting the transition of the Hungarian economy to a carbon neutral economy. Research has also underlined the importance of improving energy efficiency and the need for further penetration of renewable energy to meet our growing energy needs. But this will also require regulatory action and technical improvements.

**The MNB's Bank Carbon Risk Index is at its highest level ever, and climate exposures in lending portfolios have also increased based on the Climate Risk Matrix.** Climate risks for credit institutions increased in 2023. Loans to finance energy production and agriculture remain the most vulnerable to transition risks where the amount of credit exposures have increased. This was also reflected in the 2023 short-term climate stress test exercise, where the carbon price increase shock had a more significant impact than in 2022, while the capital position of the eight institutions under review was stable over the analysis horizon.

**Greater transparency can ensure risk reduction, which is why the MNB publishes quarterly green data and issues ESG recommendations to credit institutions and financial enterprises.** The green data publication provides data on green loan holdings, data on SFDR funds belonging to the fund management and insurance sector, and an itemised list of green securities issued by domestic participants. The MNB has also developed a recommendation on the use of a set minimum standards for the ESG questionnaire on lending, which has been widely commented by stakeholders. The draft recommendation on the questionnaire aims to enable domestic financial institutions and, through them, credit applicants to assess their ESG risks, and to integrate ESG risk assessment into the risk management processes of financial institutions. The recommendation is expected to be introduced gradually from 1 January 2025.

**In September 2023, the MNB decided to extend and prolong the Green Preferential Capital Requirements Programme to support the green transition.** By the end of 2023, credit institutions have benefited from preferential capital requirements for gross exposures of HUF 880 billion under this globally unprecedented programme, which thus has a significant market and institutional development impact. The programme has empirically proven the green hypothesis; namely, that green exposures are indeed less risky, with firms participating in the programme having significantly lower default rates. Most of the corporate loans underlying the Green Preferential Capital Requirements continue to be linked to renewable energy production. At the level of the national economy, within one year, the share of electricity generated by solar panels rose from 13.2 per cent to 18.4 per cent in 2023. The MNB has been involved in a number of research projects on energy efficiency, as the construction of new energy-efficient buildings and, more importantly, the modernisation of existing

building stock is essential for the carbon-neutral transition. Electromobility lending under the Programme has grown significantly, with exposure doubling in one year to HUF 24 billion.

**Despite international geopolitical and macroeconomic challenges, the Hungarian green capital market has strengthened.**

The adoption of the Regulation establishing a European Green Bond Standard was an important milestone at the EU level. In November 2023, the Magyar Nemzeti Bank published its Sustainable and Responsible Investment Charter, under which the MNB stepped up its green bond portfolio in line with its commitments. In 2023, the share of domestic green corporate bonds was also high by international standards, accounting for 24 per cent of the total bond portfolio. The green rate for mortgage bonds rose to 11.3 per cent and five successful green bond issues were completed last year. However, the share of green government bonds declined, while Hungary renewed its Green Bond Framework Programme for sovereign debt financing. In the fund management market, there was also a significant inflow of capital into green investments last year, as assets under management on an ESG basis exceeded HUF 328 billion, which translates to an increase of almost 80 per cent compared to the previous year.

**In 2023 a major step was taken forward in boosting investor confidence, improving disclosure and overall tackling greenwashing.**

The CSRD Directive requires companies to publish sustainability reports, which they must prepare in accordance with European Sustainability Reporting Standards (ESRS). In the case of ESG ratings, it is important to note that, due to the heterogeneous methodologies, ESMA is expected to authorise and supervise companies providing ESG ratings in the future. ESG considerations are also reflected in the Capital Requirements Directive (CRD) and Capital Requirements Regulation (CRR) for credit institutions, and they require all institutions to manage these risks appropriately.

**Among the domestic regulations, the MNB issued its Green Recommendation for the insurance sector in 2023; moreover, new detailed rules of the Green Recommendation for credit institutions have been adopted and are supervised by the Supervisory Authority.**

In December 2023, the MNB published its Green Recommendation for the insurance sector, which also faces serious challenges from changing environmental risks and the climate change. In the Recommendation the MNB sets out its expectations regarding insurers' business models, corporate governance, risk management and disclosure obligations. A new set of requirements set out in the Green Recommendation for credit institutions came into force on 1 July 2023, and will be subject to extensive scrutiny by the Supervisory Authority. It is important to note that the so-called ESG Act came into force in Hungary on 1 January 2024, which regulates, among other things, the scope of companies required to prepare annual ESG reports and the content of the reports.

**The labour market exhibits increasing demand for green finance experts year by year, which is why the MNB is also supporting green finance education and research.**

The MNB has an active education and research cooperation with the Budapest Metropolitan University (METU), the Neuman János University (NJU), the University of Szeged (SZTE), the University of Debrecen (DE) and the Budapest University of Technology and Economics (BME), under which MNB experts provide knowledge transfer support to the universities. In addition, the MNB has also provided training and education for central bankers from several countries. In 2023, overall, based on the Green Central Banking methodology and validation the MNB was ahead of the G20 central banks in terms of sustainability actions, but there are still far more opportunities for the MNB to support the green transition.

# NGFS Dashboard

Category	Indicator	Unit	HU last year's value	HU this year's value	EU average	Reference period	Change
Real economy	Share of area under organic farming within the agricultural area	%	6,03	5,81	9,10	2021	▼
	Share of the protected land areas	%	21,40	21,40	18,50	2020	▬
	Share of renewable energy sources in total final energy consumption	%	14,12	15,19	23,02	2022	▲
	Energy intensity of the economy	Oil equivalent (kg)/€1000	205,94	185,54	107,42	2022	▲
	Net energy import	%	56,60	54,10	55,50	2021	▲
	Percentage of newly registered plug-in electric vehicles	%	7,03	9,00	21,60	2022	▲
	Change in greenhouse gas emissions since 1990	%	30,64	33,43	30,34	2020	▲
	CO <sub>2</sub> emissions per unit of production	Thousand tons CO <sub>2</sub> /\$million	0,15	0,15	0,13	2020	▬
	EU ETS CO <sub>2</sub> market price	EUR/tCO <sub>2</sub> e	86,50	57,19	57,19	2023	▼
	Environmental tax revenues	GDP %	2,05	1,88	2,02	2022	▼
	Environmental protection expenditure rate	GDP %	1,70	1,60	2,30	2020	▼
	Adjusted net savings (ANS)	GNI %	11,50	11,50	11,60	2021	▬
Adjusted national net income (ANNI) growth rate since 2009 - average	%	2,45	2,49	1,22	2021	▲	
Risk	Natural resources rents	GDP %	0,20	0,40	0,20	2021	▼
	Ecological deficit (biocapacity – ecological footprint)	Million global hectares/capita	1,29	1,21	1,91	2022	▲
	Bank Carbon Risk Index (Linear)	%	7,11	7,98	n/a	2023	▼
	Bank Carbon Risk Index (Gompertz)	%	13,60	16,26	n/a	2023	▼
Mobilisation	Ratio of green bonds – central government - stock	%	4,03	3,60	n/a	2023	▼
	Ratio of green bonds – central government - 2023	%	6,16	0,46	n/a	2023	▼
	Ratio of green bonds – companies - stock	%	15,38	24,13	n/a	2023	▼
	Ratio of green bonds – companies - 2023	%	45,15	85,78	n/a	2023	▲
	Ratio of green corporate loans (Preferential capital requirements program)	%	2,11	3,31	n/a	2023	▲
	Green/ESG based investment funds – stock	%	1,64	2,05	n/a	2023	▲
	Insurance sector – ratio of green unit-linked funds	%	4,33	5,39	n/a	2023	▲
	Green/ESG based voluntary pension funds	%	0,46	0,44	n/a	2023	▼
Global Initiatives	Ratio of banks joining global initiatives on sustainability - by number of institutions.	%	50,00	65,00	n/a	2023	▲
	Ratio of banks joining global initiatives on sustainability - by balance sheet of institutions.	%	84,04	90,26	n/a	2023	▲

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# 1 International developments and domestic sustainability

*The trends of rising temperatures observed in recent decades continued in 2023. It is no surprise, as global carbon dioxide emissions continued to climb and are expected to do so in the coming years as well. Obviously, this had consequences, with a succession of record-breaking temperatures both on land and sea last year. And the change is not just about using more air conditioning in summer or less heating in winter. The problem is far more complex; it upsets the balance of nature and reduces its regenerative capacity. In addition, adversely affecting our health, productivity and comfort, the impact on people is not negligible.*

*In the current situation, mankind, or human activity, is both the source of the problem and the key to the solution. Although we are responsible for global warming at this scale and pace, but we are also the ones capable of changing this. The rapid pace of technological progress offers the opportunity to move to a low-carbon economy, protecting our natural resources. Our task at this point is to finance this change, to invest capital in the development and design of technologies for a sustainable transition.*

*As Hungary is among the countries that are less resilient to climate change, it is also in its vested interest to protect the climate. While drought played the main role in 2022, last year was characterised by record heat, high rainfall and substantial storm damage amounts. The commitment is there, the climate plan is in place, now we “only” need to make the ambitious targets a reality.*

## 1.1 GLOBAL COMPARISON

**By global standards, 2023 was the hottest year on record in more than a century and a half.** Based on indirect data – tree rings, ice cores, soil samples –, scientists make even bolder claims. They suggest that no year in the last 125,000 years has been as extremely hot as this one. In other words, it is possible that it was our hunter-gatherer ancestors who experienced a year as extremely hot as 2023 for the last time.

**Last year<sup>1</sup> the global average temperature was 1.48 degrees Celsius above pre-industrial levels, i.e. the 1850–1900 average.** At first glance, this increase may not seem like much. But in terms of climate change, warming as small as a tenth of a degree Celsius can have significant impacts by moving various tipping points (changing ocean currents, releasing methane gases trapped under frozen ground). It is no coincidence that in Paris in 2015, world leaders set the target to keep global temperature rise well below 2 degrees Celsius above pre-industrial levels and to strive to limit the increase maximum at 1.5 degrees Celsius.

**The global average temperature recorded last year almost reached the Paris target range.** That notwithstanding, there is still no sign of even a temporary relief. The World Meteorological Organization of the UN<sup>2</sup> predicts that 2024 will be a new record year, and there is a 66 per cent chance of not only approaching but also exceeding the +1.5 degrees Celsius psychological limit in one of the next four years. The upper limit of the Paris temperature target is hopefully not yet in danger in the short term, and a sustained (multi-year) breach of the +1.5 degrees Celsius can be postponed for some time. However, if we do not act soon, warming will place an increasing burden on our economies and societies. What is most feared is that, at some point, it will become irreversible and an existential threat to humanity.

**The cause of the warming is no longer a question.** The scientific consensus is that we humans are “without a doubt”<sup>3</sup> responsible for this situation through the burning of fossil fuels and the destruction of natural vegetation. Climate change on a global scale is changing at lightning speed due to the growing concentration of CO<sub>2</sub> and other greenhouse gases (GHGs) in the air. This is why decelerating

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<sup>1</sup> [Surface air temperature for December 2023](#)

<sup>2</sup> [Global temperatures set to reach new records in next five years](#)

<sup>3</sup> [Human Influence on the Climate System](#)

warming and, ideally, stabilising temperature levels can be achieved by reducing greenhouse gas emissions and increasing their capture from the air.

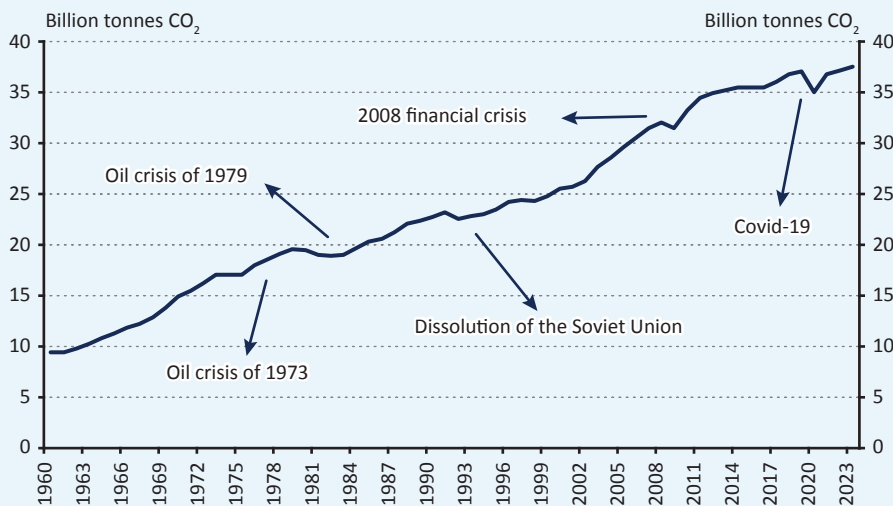
**The year 2023 was also a record year for GHG emissions.** CO<sub>2</sub> emissions from fossil fuel combustion (which account for about three quarters of all greenhouse gases) rose by 1.1 per cent in a year to 37.5 billion tonnes<sup>4</sup> (Chart 1.1). As with the annual average temperature, the trend for GHG emissions has been steadily increasing for decades, interrupted only by occasional periodic declines (e.g. during the collapse of the Soviet Union in the early 1990s or the financial crisis of 2008–2009). Most recently, global GHG emissions have stalled and fallen due to the pandemic. However, as the COVID-19 pandemic waned, not only economic performance bounced back, but emissions did as well, and as a result, we were puffing 1.9 per cent more GHGs into the air in 2023 than in 2019.

**Fortunately, there are also encouraging signs.** While the slowing and stabilisation of temperature rises are still decades away even in the best-case scenarios, it is conceivable that GHG emissions have peaked already and will never creep above 2023 levels. German analyst firm Climate Analytics sees a 70 per cent chance<sup>5</sup> that

GHG emissions will start to fall in 2024, making 2023 the long-awaited turning point. The International Energy Agency (IEA) takes a similar view<sup>6</sup>, although its analysts are somewhat more cautious, predicting a peak in the “mid-2020s” and subsequently, a stagnation at high levels for some time. The organisations base their optimism on the dynamic growth in recent years in investment required for the decarbonisation of the global economy – more specifically, the energy transition – and on the assumption that this trend will continue.

**New technologies are indispensable for a steep reduction of the GHG trend.** In order to reach the emissions peak and in the period to follow, further investments are needed to enable the technologies. According to Bloomberg New Energy Finance (BNEF)<sup>7</sup>, the value of energy transition investments (e.g. renewable energy, electric cars, batteries, power grid upgrades) increased by 17 per cent in 2023 to USD 1,769 billion in one year. The 2023 level is more than triple the 2019 value, which is a remarkable increase, but still well below the trajectory compatible with the Paris temperature limit (Chart 1.2). According to BNEF, an average annual investment of at least USD 4,840 billion in clean energy is needed to keep warming below 2 degrees Celsius over the period of 2024–2030.

**Chart 1.1**  
Global CO<sub>2</sub> emissions from fossil energy sources



Source: Global Carbon Project and Global Carbon Budget

<sup>4</sup> Global Carbon Budget 2023

<sup>5</sup> When will global greenhouse gas emissions peak?

<sup>6</sup> World Energy Outlook 2023

<sup>7</sup> Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach

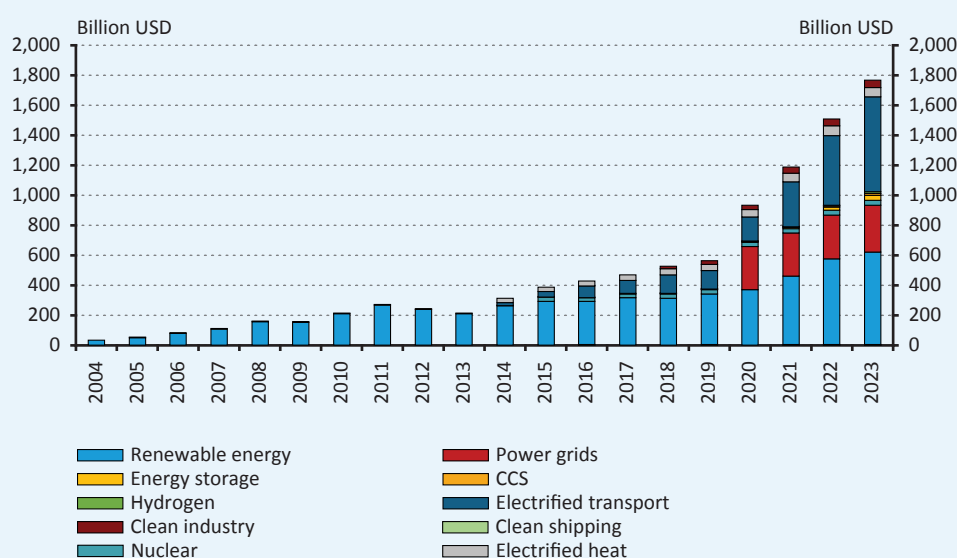
**However, it is a challenge to step up investment at this pace.** Even in a macroeconomic environment like the one we had in 2015 at the time of the Paris Agreement, it would not be easy. At the time, the low interest rate environment facilitated access to credit, and the relatively calm geopolitical environment favoured overall investment appetite. Unfortunately, 2023 and apparently, the year ahead, represent a completely different era. Inflation remains higher than desirable in most places, forcing central banks to keep interest rates high and making it more expensive to finance investment. There is a war<sup>8</sup> between Russia and Ukraine, between Israel and Hamas, and there is an ongoing fighting in Yemen. Macroeconomic uncertainties are exacerbated by the economic crisis in China's real estate sector and the unfolding crisis of confidence in the closely related financing market. The relationship between the US and China, i.e. the world's two largest economies and the two largest GHG emitters remains tense despite the easing seen in the final months of 2023. Adding to the uncertainty is the fact that countries with half the world's population – such as the US, India and the EU – are holding elections this year, which could lead to radical changes in direction.

**A recession – which is feared by many – could reduce GHG emissions in the short term.** This was also the case in 2020, the year of the pandemic. Some activists<sup>9</sup> see the solution specifically in contracting GDP. In the long term, however, climate policy cannot be built on a decline in GDP, because

in a shrinking economic environment technological progress would decelerate and decarbonisation – and, in a broader sense, the sustainability turnaround – require not only investment but also innovation and increased resources. According to IEA analysts<sup>10</sup>, by 2050 almost half of the reduction in the then prevailing GHG emissions will have to rely on technologies that are still in the demonstration or prototype phase, and will still require significant innovation for gaining market access and for their increasingly widespread use. This is particularly true for heavy industry and long-distance transport.

**Fortunately, innovation in clean technologies and the sustainability turnaround are not necessarily a burden any longer.** Even with a gloomy economic outlook, governments cannot simply move it back in their order of priorities. Quite the contrary. By now, sectors such as electric car manufacturing, renewable energy activities or hydrogen production have clearly become the key to putting the economy on a sustainable growth path, and have become the determinants of the future geopolitical landscape. A competition for green investment has emerged between the world's major powers, which is increasingly referred to as the “green arms race”. China has been building its solar cell, battery and wind turbine manufacturing bases for years without sparing budgetary resources, and it has become a dominant player in the global market. The US has entered the race in 2022 with its Inflation Reduction Act, allocating USD 370 billion of budget resources to support climate and energy investment. Earlier this year,

**Chart 1.2**  
Global energy transition investment by sector



Source: Bloomberg New Energy Finance

<sup>8</sup> at the time of preparing the report

<sup>9</sup> Degrowth

<sup>10</sup> Net Zero by 2050

the EU finalised its Net Zero Industry Act, which aims to have Europe producing strategically important clean technologies, deploying carbon capture and storage (CCS) solutions and installing hydrogen electrolyzers by 2030.

**These efforts are all necessary and commendable from a sustainability perspective.** However, they are difficult to achieve from budgetary funds relying solely on taxpayers' money. In an analysis last year<sup>11</sup>, the IMF calculated that if countries were to achieve their 2050 climate neutrality target by way of purely fiscal means, that alone could increase their debt burden by 45–50 percentage points, putting their economies on an unsustainable debt path.

**It is essential to mobilise private sector resources, which can take different forms.** In recent years, sustainable finance instruments have been gaining ground year after year, essentially aiming at nudging private funds towards green finance by strengthening the sustainability information architecture (disclosure obligations, green taxonomies, relevant green financial regulations and products). These instruments alone cannot meet climate and other broader sustainability goals, but they are an essential part of the public regulatory arsenal by accelerating the positive processes that have begun.

## 1.2 SUSTAINABILITY OF THE DOMESTIC ECONOMY

**The year 2023 proved to be the warmest year on record not only globally, but also in Hungary.** Detailed data have been available since 1901, and without doubt, no higher annual average temperature has been recorded since then. A comparison with pre-industrial levels is not possible due to a lack of data, but the average temperature in 2023 was 1.5 degrees Celsius above the average for the period of 1991–2020<sup>12</sup>. The warming trend is aptly illustrated by the fact that nine of the ten hottest years have occurred since 2000 (the 10th year, 1994, is the only TOP10 year of the previous century). Numerous examples could be cited from 2023 when the weather was very unusual for the time of year. Perhaps the most extreme of these examples were the daytime temperatures of over 30 degrees Celsius in several parts of the country on 20 October, and the temperatures of over 20 degrees Celsius on the same day at dawn.

**Last year was not only warm, but it was also remarkable in terms of the frequency of storms.**<sup>13</sup> After two consecutive particularly dry years, 2023 saw above-average precipitation, often in the form of sudden downpours. So much so, that in the 123 years since detailed data disclosure started, only seven years have exceeded 2023 in terms of rainfall. As a result, during the May–September storm season, insurers reported claims payments<sup>14</sup> at levels unprecedented for more than a decade. Fortunately, the rainy weather had a blessing in disguise. After an extremely poor average corn yield of 3.4 tonnes per hectare in the record drought year of 2022, Hungarian farmers harvested an above-average crop of around 8.2 tonnes per hectare<sup>15</sup> in 2023.

**Hungary is not immune to global warming.** A significant part of its territory is considered to be among the most vulnerable to climate change in the European Union<sup>16</sup>. The extreme weather events of the past two years will become more frequent, more intense and more damaging in the future. Adjustment to changing conditions (called adaptation in climate jargon) is indispensable. At the same time, adaptation measures such as planting drought-tolerant crops and building flood defences have their limitations. It is therefore in our vital interest to place equal emphasis on reducing emissions (also known as mitigation) alongside adaptation. By reducing emissions as quickly as possible at global, EU and domestic level, we can hope to slow climate change and meet the temperature targets (global average surface temperatures will not rise more than +1.5–2 degrees Celsius) that are at the heart of international climate protection efforts.

**In international climate policy, Hungary acts and sets targets as part of the EU, in conjunction with the EU.** The EU's climate target – and thus, Hungary's – is among the most ambitious in the world. Hungary, together with the other 26 Member States, has made a collective commitment to reduce its GHG emissions by at least 55 per cent by 2030 relative to the 1990 level (including the carbon sequestration provided by forests) and to become climate neutral by 2050 at the latest (Chart 1.3). Regarding meeting the climate target, Hungary is performing better than the EU average. While preliminary data suggest that between 1990 and 2022 the EU as a whole<sup>17</sup> will achieve a 32.5 per cent reduction in GHG emissions (including the impact of forests), Hungary will reduce GHG emissions by 41.7 per cent<sup>18</sup>.

<sup>11</sup> [Climate Crossroads: Fiscal Policies in a Warming World](#)

<sup>12</sup> [2023 was the warmest and the 8th wettest year since 1901](#)

<sup>13</sup> [2023 was a year of big storms](#)

<sup>14</sup> [Claim payouts for this year's storm season set a decade-long record](#)

<sup>15</sup> [Hungarian harvest data for 2023 and the hope for corn](#)

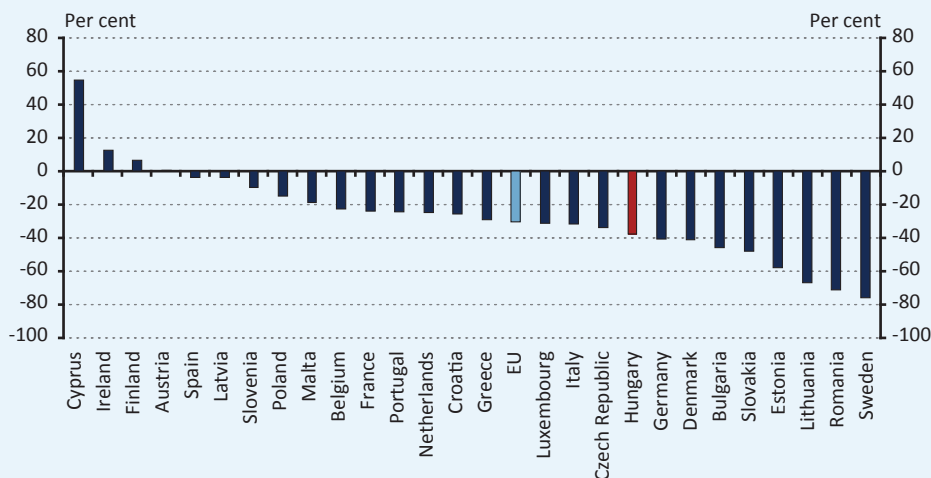
<sup>16</sup> [Potential vulnerability to climate change](#)

<sup>17</sup> [Progress Report 2023](#)

<sup>18</sup> based on data from the Hungarian Meteorological Service



**Chart 1.3**  
Changes in GHG emissions 1990–2022



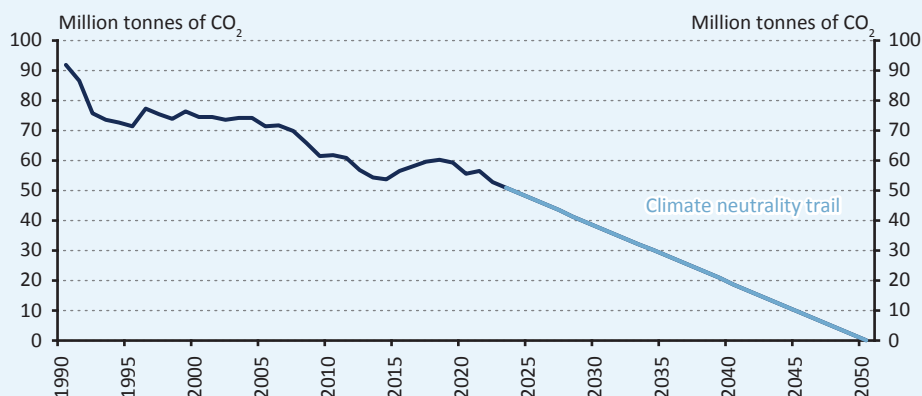
Note: LULUCF sector and aviation sector excluded  
Source: EEA

In 2022, Hungary emitted 53.14 million tonnes of GHG in CO<sub>2</sub> equivalent (Chart 1.4). This is 6 per cent less than the 2021 value (including the carbon sequestration in forests). This is a remarkable decline, especially as the economy’s output expanded by 4.6 per cent. The main reason for the fall in emissions was the energy crisis following the Russia-Ukraine war, which led to a significant rise in energy prices, encouraging companies, municipalities and households to save energy. Reduced industrial production and fertiliser use due to extremely high natural gas prices also played a role in the reduction of emissions. However, the fall in GHG emissions was somewhat dampened by the transport

sector, which increased by 8 per cent in the span of a year. Transport is the main bogeyman of climate protection worldwide. In the case of Hungary, GHG emissions from the whole economy have fallen over the past 30 years (between 1990 and 2021), while emissions from the transport sector have jumped by more than 60 per cent to become the sector with the largest carbon footprint.

In 2023, Hungary made further progress towards its long-term climate neutrality goal. Although GHG data for 2023 are not available, other indicators in the economy suggest that the decline in emissions continued last year. The decline

**Chart 1.4**  
Change of Hungary’s GHG emissions between 1990 and 2022 and path to the 2050 target



Note: with LULUCF sector included  
Source: Országos Meteorológiai Szolgálat (Hungarian Meteorological Service)

in our natural gas consumption<sup>19</sup> continued in 2023, with consumption reaching 8.5 billion m<sup>3</sup>, down 10.9 per cent compared to 2022 and 23 per cent compared to the pre-Russia-Ukraine war (2021). In addition to the energy crisis, the mild winters of the past two years contributed to the decline, as they meant that less heating was needed than usual. Hungary's electricity consumption also decreased by 4.7 per cent to 41TWh, and its fuel consumption was 15.7 per cent lower<sup>20</sup> than in 2022.

**Reducing emissions is not only good news for our planet's climate.** From a macro-economic perspective, GHG reduction can be achieved by reducing the use of fossil energy sources, which has a positive impact on the competitiveness, financial stability and energy sovereignty of the country. Hungary is heavily dependent on imports of fossil fuels – mainly natural gas and oil – which, if they become more expensive, could destabilise its trade balance and current account, deteriorating its current account balance. The burning of fossil fuels also has a negative impact on air quality, which in turn affects the country's macro-economic position through negative impacts on tourism revenues and healthcare spending.

**The statutory mandates of the MNB are also affected by developments in the energy market.** Developments in the energy market over the past two years have highlighted the risks arising from our exposure to energy import dependence, and steps to reduce these risks are in line with the MNB's mandates. Indeed, the hectic fluctuations in energy prices have affected not only MNB's primary objective of achieving and maintaining price stability, but also all of its statutory mandates through their impact on financial stability, economic growth and competitiveness. Of course, the sustainability aspect should also be mentioned as indeed, the Act on the Magyar Nemzeti Bank stipulates that starting from 2021, it is the MNB's duty to support the government's efforts in environmental sustainability without compromising its primary mandate<sup>21</sup>.

**In conjunction with the Zero Carbon Centre (ZKK), the MNB has launched a research programme to reduce natural gas consumption.** In this framework, the regularly organised annual international Green Finance Conference in October has placed its focus on energy efficiency. The MNB–ZKK project has produced specific proposals on

how to make the reductions in gas consumption over the past two years sustainable. The proposals – boosting biomethane production, improving energy efficiency in buildings, expanding district heating based on renewable energy, replacing natural gas used for regulation in renewable electricity generation with batteries – and the main issues of energy efficiency in general were discussed at the international conference by representatives of organisations such as the International Energy Agency, the European Commission and the University of Oxford.

**Another positive development in 2023 was the further greening of the composition of domestically generated electricity.** The dynamic expansion of solar powerplants continued, with the share of electricity generated from solar panels rising from 13.2 per cent to 18.4 per cent of the total electricity production in one year<sup>22</sup> by 2023 (Chart 1.5). Hungary's "solar boom" is also remarkable by international standards. The Hungarian figure is almost double the EU average (9.2 per cent), and it was only surpassed by Greece (19.0 per cent) in 2023. Two thirds of our solar energy production comes from solar farms and one third from rooftop solar panels.

**Ramping up electricity production, including CO<sub>2</sub>-free electricity generation, is key.** In order to put the economy on a climate-friendly path, we need to gradually shift more and more of our energy consumption to electricity. This trend, known as "electrification", means electric vehicles in transport, and in our homes, it primarily means moving from gas heating to electric heat pumps. Electrification has become a guiding principle of climate policy for two main reasons. On the one hand, electricity generation is already relatively clean and there is a good chance that it can be made almost completely CO<sub>2</sub>-free in the medium term. On the other hand, electrical appliances generally consume much less energy than their non-electrical counterparts used for the same purpose; consequently, the switch to electricity-based technology itself facilitates energy efficiency.

**In addition to the cooperation to achieve a lasting reduction in natural gas consumption, the MNB has also carried out another study in cooperation with the ZKK.** Analysts were trying to decide whether Hungary can meet the projected surge in electricity consumption in the coming

<sup>19</sup> Domestic gas consumption was reduced by 2.5 billion cubic metres in two years

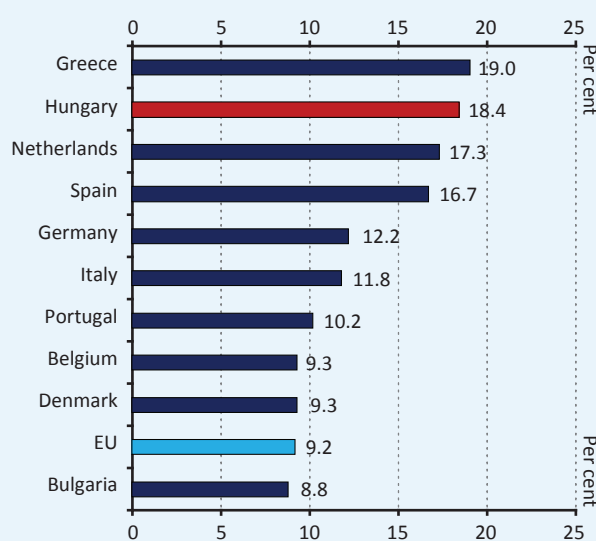
<sup>20</sup> Aggregate fuel sales by member companies of the Hungarian Petroleum Association (MÁSZ)

<sup>21</sup> dr-kandracskcsaba-energiatfuggoseg-es-jegybanki-mandates.pdf (mnb.hu)

<sup>22</sup> European Electricity Review

decades in a climate-friendly way. The research, published in July 2023, examined several scenarios and concluded that relying on renewable energy sources (more solar and less wind) could meet up to 2.2 times the increase in electricity demand without any significant change in Hungary's electricity imports (currently two-thirds of its electricity production covers its electricity consumption, the remaining third is imported). However, the authors of the study argue that this will require significant progress not only in developing the electricity grid, but also in balancing renewable capacity, creating a well-functioning, resilient market and harnessing wind energy. According to the ZKK, these steps do not jeopardise the security of supply and are in line with the government's other power plant construction plans (the three, gas-fired power plants envisaged and Paks 2). Under the MNB–ZKK "Green Power" project, a series of 12 articles<sup>23</sup> was published on the online platform of the business daily Világgazdaság, and the MNB also organised a one-day conference on 14 September 2023 to discuss the topics covered by the study.

**Chart 1.5**  
Share of solar energy in total electricity generation in 2023



Source: Ember Climate

### Box 1

#### Green Power project

**The greening of the energy mix supports sustainable economic growth by increasing the share of renewable energy-based electricity generation.** This scenario implies higher economic output, a more resilient inflation path to external shocks and improved competitiveness. And we also get closer to achieving our sustainability goals. This will enable the MNB to support, in addition to its primary objective, the government's policy on environmental sustainability. With all these considerations in mind, the Magyar Nemzeti Bank and Zero Carbon Centre (ZKK) joined forces to carry out a joint research project entitled Green Power. The project resulted in a study, the main content of which was presented in a 12-part article series published between 21 July and 12 September 2023.

**In the articles, MNB and ZKK executives and experts clarify the interest of the central bank and financial supervision in increasing the role of solar and wind energy in electricity generation.** The key message of the article series is that the domestic energy mix and its sources are intrinsically linked to the MNB's mandate under the Act on the Magyar Nemzeti Bank. On the one hand, the MNB's primary objective is to achieve and maintain price stability, and the rapid increases in energy and commodity prices in recent years have highlighted the significant inflationary risks associated with imported energy.

**The MNB supports the stability of the financial intermediary system without compromising the price stability objective.** Changes in Hungary's external balance are of particular importance for financial stability, and external balance is directly influenced by the volume and price of imported energy. In 2022, the year of the outbreak of the Russia-Ukraine war, the trade deficit amounted to 4 per cent of GDP, largely due to the energy crisis. This is because the energy deficit, which is the ratio of energy and energy commodities exports to imports, more than doubled to 9.7 per cent of GDP. This, of course, also had a negative impact on the current account. Increasing the share of domestic renewable energy and boosting energy efficiency are essential to make economic growth sustainable.

<sup>23</sup> What is the MNB doing to promote renewable energy production – GreenPower series 12.

**The Green Power article series also addresses the importance of electrification and provides an insight into the current state of electricity generation and supply in Hungary.** As technology develops and economic production increases, our energy demand increases, but this does not necessarily mean that our energy consumption increases. For example, it can be reduced by electrifying our transport and heating. This is partly because electricity-based technologies are more energy efficient, and on the other hand, because they are easier to set up on a renewable basis. The authors of the articles discuss the macroeconomic and social benefits of stepping up renewable electricity generation. Electrification and renewable domestic energy production, which are essential for Hungary's energy sovereignty, can reduce climate change-causing carbon emissions, lower household energy bills and contribute to improving quality of life, not to mention the corporate competitive advantages for the domestic energy sector (attracting investment, employment).

**The series of articles also discussed the technical and financial obstacles to be overcome to achieve renewables penetration, identifying possible next policy steps.** Perhaps the main technical difficulty in the gaining ground of weather-dependent renewables is the ability to integrate new capacity into the electricity system. This requires increasing the flexibility of the domestic electricity system. The steps to build flexibility markets include international market interconnection, the development of distribution network flexibility markets, the development of MAVIR's flexibility market, the creation of consumer-side flexibility capabilities and the conditions for existing ones to enter the market, and the spread of aggregators and energy communities. At the same time, renewable energy investors have their own financial difficulties: most of their costs are incurred in foreign currency, which entails exchange rate and interest rate risks. These risks are mostly present throughout the construction phase of a power plant, which lasts several years. In recent years, exchange rate and interest rate fluctuations have significantly reduced the returns on these investments and have also had a negative impact on investor interest. The authors argue that these risks can be mitigated by, among other things, long-term power purchase agreements, but also by financing power plants based on a portfolio of projects rather than a single one.

**The MNB–BME ZKK Workshop project and series of articles, which explore the above topics in detail, were intended to provide a forum for professional discussion at the MNB's Green Power conference on 14 September.** The main objective of the meeting was to raise the priority of renewable energy on the agenda of policy makers, municipalities, the financial sector, the business sector and, indirectly, the public.

## 2 Measuring sustainability-related financial risks and negative environmental externalities

Mapping climate change risks into financial risks is still a major challenge today. It can be considered a discipline where there is still plenty of room for improvement and development, as there are no generally accepted international standards and proven methods to accurately quantify these risks. In the past year, the Magyar Nemzeti Bank has acted in this spirit, developing new methodologies and refining its existing tools. In addition to the techniques developed by the central bank, we should also remember the work carried out in international cooperation, which allows for synthesising different perspectives and knowledge.

The MNB's efforts include understanding and measuring climate risks and sharing the knowledge and conclusions with market participants. With this in mind, it has revised and refined the methodology of its carbon risk index and short-term bank climate stress test, which has been in use since 2021, to make it more understandable and to incorporate new knowledge. In addition, to address the data gap, the central bank plans to issue a set minimum standards for the ESG questionnaire on lending in 2024 to promote and create a framework for sustainable lending. In parallel with its own research, it is also working on a biodiversity risk assessment project with the OECD and the European Commission, with the aim of providing a quantitative, data-driven account of the consequences of the degradation of our natural environment.

### 2.1 TRENDS IN THE BANK CARBON RISK INDEX



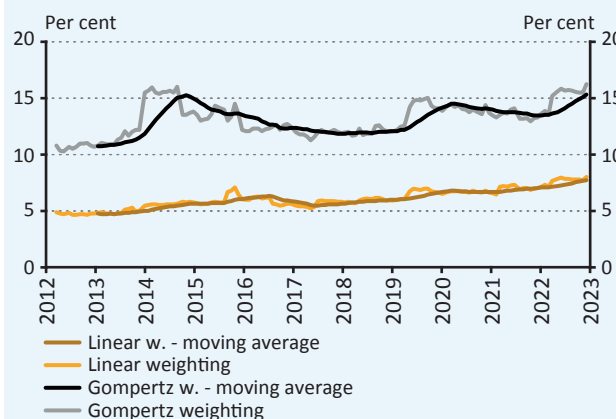
The MNB's Bank Carbon Risk Index is at its highest level ever. The MNB's first indicator to monitor climate risks in the banking sector exhibited a strong increase in climate risks after the stagnation observed in 2022. The index captures the risks from the GHG

intensity of each economic activity based on two logical assumptions. The linear index assumes that the transition climate risks increase in parallel with GHG intensity; thus the companies potentially most exposed to climate change-related regulatory activities (e.g. the levy of carbon taxes) are also the most polluting entities. By contrast, the Gompertz function considers the risks from GHG intensity to be negligible below a certain level, and after a rapid ramp-up it considers the group of companies considered to be large polluters to be equally risky above a critical level, regardless of which of them is the larger polluter. The index looks at the portfolio of credit institutions based on the extent to which they finance polluting activities in their corporate loan portfolio. The index is a measure of the proportion of the total loan portfolio that is considered at

risk, potentially the default value of the corporate portfolio if very strict climate change regulations are introduced.

Climate risks for credit institutions increased drastically in 2023. Based on the more conservative Gompertz function, which assumes higher risks, 16.26 per cent of the loan portfolio was considered risky, representing an increase

**Chart 2.1**  
Monthly values and annual retrospective moving average of the banking system's BCRI



Source: MNB

of 2.66 percentage points compared to the end of 2022 (Chart 2.1). Based on the more lenient linear assumption, 7.98 per cent of the corporate loan portfolio was considered to be affected by transition climate risks, which translates to an increase of 0.87 percentage points compared to the previous year-end position. Loans financing energy production and agriculture continue to be the most exposed to transition risks. In 2023, of the four largest polluting sectors<sup>24</sup>, electricity production and agriculture received more financing (Appendices 1–2), while lending to the rental, operative leasing and oil and gas extraction sectors increased the value of the index.

**The methodology of the index has been modified significantly.** The MNB has addressed the issue of annually changing GHG intensity and deemed green lending free of transition climate risks. The baseline risk measures are highly dependent on the trend of the annual sectoral GHG intensity data published by Eurostat. In previous years, we have seen the extent to which the update of the GHG intensity data from 2017 to 2019 and then to 2020 affected the values of the index (Chart 2.2). From this year, however, the MNB moved from the annual fixed GHG intensity data to GHG intensity data for the specific year<sup>25</sup>. This was necessary to ensure that the effects of annually changing GHG intensity data are more accurately reflected in the

index. GHG intensity values are also highly dependent on the value added or GHG emissions of a sector in a given year, if the value added capacity of a sector changes significantly<sup>26</sup> this has a large impact on the GHG intensity value. Instead of the sectoral GHG intensity data published by Eurostat, the MNB used a modified GHG intensity data<sup>27</sup> that treat companies that are large emitters under the EU ETS separately from companies that are not, thus providing a more accurate picture of climate risk trends. Another important innovation was that green loans were treated as exposures free of climate risk; thus, for example, a loan to finance a solar power plant does not increase the value of the BCRI. Despite the methodological changes, the same trends emerge. Based on both the original and the revised BCRI, at the end of 2023 the risk indicator was at its highest point ever. Over 16 per cent of the corporate loan portfolio was considered risky under the modified methodology and almost 20 per cent under the old methodology (Appendix 3). The last time the index showed a similarly high risk score was in 2014.

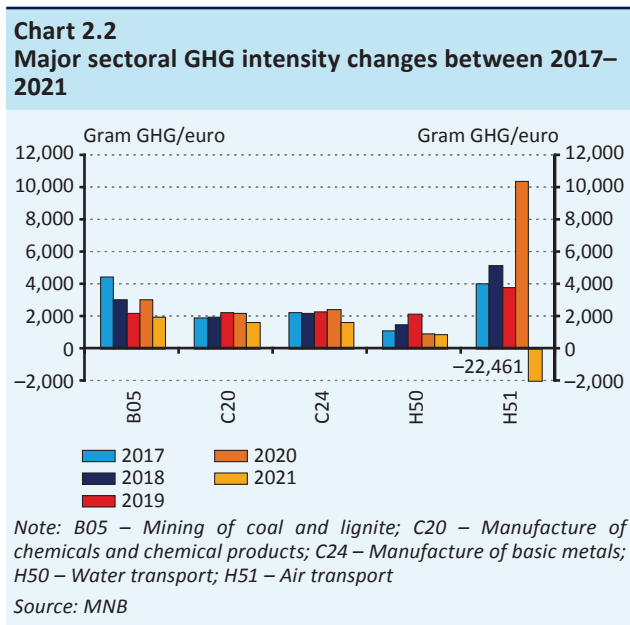
## 2.2 CLIMATE RISK MATRIX – A SNAPSHOT OF THE HUNGARIAN BANKING SYSTEM



Climate exposures in bank portfolios increased based on the [Climate Risk Matrix](#) as well. Alongside the BCRI, the Climate Risk Matrix is the MNB’s second easy-to-implement tool for measuring transition climate risks.

The climate risk matrix classifies credit institutions into one of the following five groups based on the riskiness of their corporate loan portfolio: (i) upper quartile, (ii) upper-middle quartile, (iii) lower-middle quartile, (iv) lower quartile, and (v) grey zone groups. Institutions in the top quartile comprise the group most exposed to transition risks, while those in the bottom quartile face negligible transition climate risks. As the name of the group suggests, the riskiness of the members of the grey zone cannot be clearly defined.

**The location of institutions on the Climate Risk Matrix reflects the results of two different analysis tools, where each point represents one institution.** One methodology



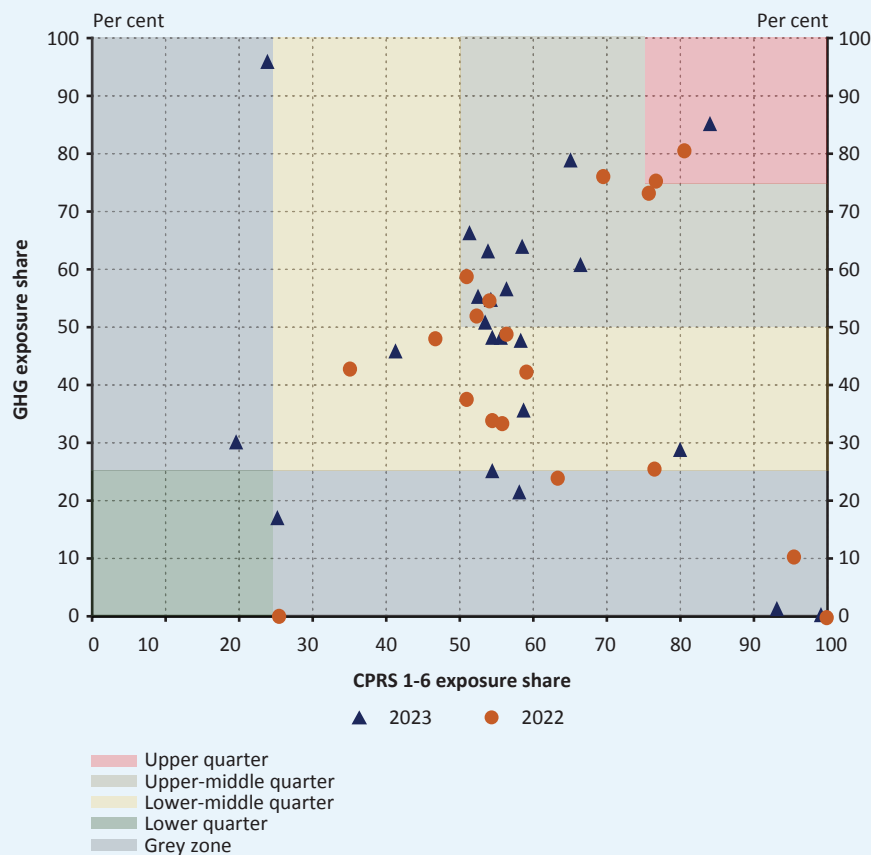
<sup>24</sup> The BCRI index is most affected by the financing of the sectors of agriculture, chemicals, land, pipeline transport and electricity production.  
<sup>25</sup> In practice, this means that the 2012 index values are calculated based on the 2012 sectoral GHG intensities, the 2013 index values are calculated based on the 2013 sectoral GHG intensities, and so on.  
<sup>26</sup> For example, in 2020–2021, the value-added capacity of the air transport sector fell sharply compared to previous years, and then turned negative in 2021, causing a large swing in GHG intensity.  
<sup>27</sup> The methodology for modifying sectoral GHG intensity data is available here, and the latest results are presented here. The results are expected to be published in table form later this year.

used by Battiston et al. (2017)<sup>28</sup> assesses the loan portfolio of credit institutions based on the classification of Climate Policy Relevant Sectors (CPRS). The CPRS is capable of classifying the exposures of a debtor company into groups affected or not affected by climate change policies based on the main activity of the debtor company. The first six of the nine groups established are considered to be at risk due to climate change, and these are: (1) fossil fuel, (2) utility provider, (3) energy intensive, (4) buildings, (5) transportation, (6) agriculture. The X-axis in Chart 2.3 shows the percentage of the total corporate loan portfolio that falls into one of the 1–6 CPRS categories that can be considered risky. The other analysis tool, similar to the BCRI, sorts companies into pollution groups based on the GHG intensity of the debtor’s activity. As in the case of the BCRI, the Climate Risk Matrix used adjusted sectoral GHG data and individual intensity data from ETS companies to determine the GHG exposures of institutions. Six pollution groups were established based on the GHG intensity of the debtors’ economic activities: (i) very low, (ii) low, (iii)

medium, (iv) medium/high, (v) high and (vi) very high. The Y-axis in Chart 2.3 shows the percentage of the portfolio of each credit institution that is exposed to companies in the high pollution category (medium/high, high, very high). The two instruments thus result in two values per institution, which determine their position in the matrix. Due to the methodological change mentioned above, the values of the Climate Risk Matrix for the end of 2022 have also changed, and are therefore interpreted in relation to the results under the new methodology. The Chart shows both the 2022 and 2023 year-end results, with values based on the revised methodology.

**61 per cent of credit institutions fall into the upper-middle quartile of risk.** Looking at the distribution of credit institutions in terms of total assets, although the upper quartile, which is considered very risky, fell from 3 per cent to below 1 per cent, the second riskiest upper-middle quartile accounted for 61 per cent of the banking system at the end of 2023. Compared to 2022, this represents

**Chart 2.3**  
**Climate Risk Matrix of the Hungarian banking system**



Source: MNB

<sup>28</sup> Battiston, S. – Mandel, A. – Monasterolo, I. – Schütze, F. – Visentin, G. (2017): A climate stress-test of the financial system. Nature Climate Change, 7(4): 283–288. <https://doi.org/10.1038/nclimate3255>

a significant realignment, as the upper-middle quartile was only 15 per cent in 2022. The substantial change is due to the significant number of institutions that are in the lower-middle quartile and upper-middle quartile, meaning that several institutions switched groups in 2023. There has also been a significant increase in the grey zone, with the share of these institutions rising from 6 to 14 per cent. Unfortunately, the lower quartile reserved for the least risky institutions was an empty set at the end of both 2022 and 2023.

## 2.3 SHORT-TERM CLIMATE STRESS TEST



The short-term climate stress test is designed to measure the risks of transition to a low-emission economy and identify the banks most vulnerable to them. It is also a learning process on the part of the MNB, which is important because the

Green Recommendation requires Hungarian banks to use forward-looking methodologies (e.g. stress tests) to assess climate and environmental risks from 2025. After the [long-term stress test](#) in 2021, the MNB continued its exercise focusing on short-term transition risks in 2022 and 2023. The climate stress test examines the resilience of the banking sector (compared to a baseline value) in a scenario with a transition risk focus. 8 major banks participated in the short-term stress test.

**According to the scenario narrative, a significant carbon price rise hits Hungary.** This increases the likelihood of default for companies with significant greenhouse gas emissions. In the stress scenario, the study conservatively quantified the carbon price increase for the economic variables as a 100 per cent increase in global oil prices. As Hungary is a net energy importer, the impact mechanism of the two price increases (carbon and oil prices) is very similar. In the stress scenario, at the end of the 3-year time horizon, GDP levels are 5 per cent lower than the baseline and household incomes are 8 per cent lower. The climate stress path causes inflation to rise by 5 percentage points after 1 year.

**The methodology is based on macroeconomic, sectoral and a growing body of individual, company-level information.** The methodology distributes the overall macroeconomic impacts across sectors in proportion to their GHG emissions and accordingly, more polluting sectors face higher risks and less polluting sectors face lower risks.

The exercise's methodology relies primarily on sector-level pollution data, but increasingly broader granular credit and customer-level information has been incorporated into the calculations. For some companies, the methodology also takes into account the fact that their potential cost increases will be compensated by consumers. For individual, credit-level data, the expanding information set from the Green



Corporate Preferential Capital Requirements programme will significantly improve the quality of the analysis and the ability to distinguish between green and polluting exposures. This can be improved further in the future with the help of the EU Taxonomies data fields. For a more detailed description of the methodology, see [last year's Green Finance Report](#) and the [study in the Financial and Economic Review](#).

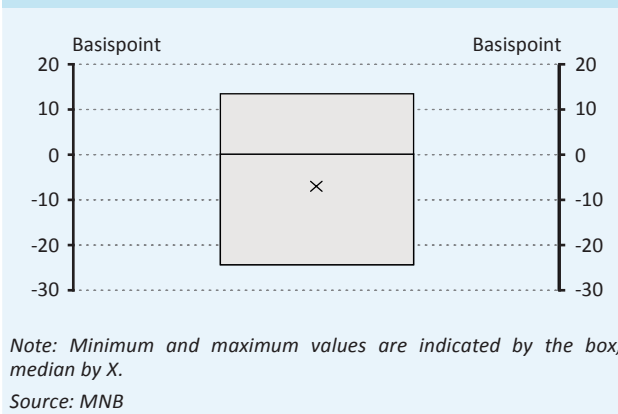
**The impact of the stress scenario on the Hungarian economy is higher than in last year's exercise.** However, it is also worth adding that it is lower than in the case of the regular prudential supervisory stress test. Under the stress scenario, corporate loans' probability of default (PDs) are consistently higher than the baseline; for example, PDs in the second year are 1.1 percentage points higher than the baseline. This increment in the probability of default is distributed differently across sectors, with the most vulnerable sectors being energy and utilities. In their case, corporate PDs in the second year are 5 and 3 percentage points higher than in the baseline scenario, respectively. It is important to underline that the risk of green loans and loans to green firms only increases due to macroeconomic effects; they are not affected by the transition-specific effects in the same way as their sectoral peers. Due to their low energy and carbon intensity, real estate investment, trade and intellectual activities and hospitality services are also less affected by the stress test.

**The results of this exercise suggest that the transition risks are not dramatically concentrated on the balance sheet of any single credit institution.** The bank-level effects yielded similar results as last year's analysis, as the sectoral composition of banks' portfolios has not changed significantly over the past 1 year. The average PD of the corporate loans of the bank whose corporate loan portfolio is most exposed to energy price changes is increased by 13 basis points by the fact that its customers with the highest exposures act in energy-intensive industries (Chart 2.4).



In addition, the fact that loans from large companies in carbon-intensive sectors tend to have lower than average collateralisation has an additional impairment-increasing effect for banks. Thus, the resulting higher LGDs are impairment-increasing factors.

**Chart 2.4**  
The impact of sectoral risk differences on the average PD of banks' portfolios



**While the impact of transition risks on the credit risk of the most affected companies is significant, all participants of the banking sector remain stable over the time horizon under review.** The impact of these transition risks on the banking system may be significant, but manageable. Although the composition of the loan portfolios of large banks is somewhat heterogeneous from a climate risk perspective, it is not to the extent that increase the capital risk of any one institution significantly in the stress test.

**Institutions are advised to pay more attention to managing environmental risks.** The credit risk impact of environmental risks can be significant for the companies most affected. In addition, as time progresses, the likelihood of the materialisation of transition risks increases exponentially.

## 2.4 SET MINIMUM STANDARDS FOR THE ESG QUESTIONNAIRE ON LENDING

**Taking ESG risks into account in lending processes is becoming increasingly important.** The role of environmental, social and governance (ESG) information in relation to lending is being actively addressed by EU institutions. Domestic banks and financial information provider companies are also showing keen interest in the topic. Recognising all these developments and drivers, and

as part of its own ongoing monitoring activities, the MNB has examined the domestic and international ESG risk environment, requirements and directives. As a result of the review, the MNB concluded that it was appropriate to integrate ESG risks into the risk management process of the lending activities of financial institutions, the first step of which was the uniform collection of ESG information.

**The MNB is also planning to issue a recommendation on the application of a set minimum standards for the ESG questionnaire on lending to assess ESG information.** The MNB aims to collect ESG information by using a set minimum standards for the ESG questionnaire on lending that companies applying for a loan must complete at the creditor bank. The draft recommendation on the questionnaire aims to enable domestic financial institutions and, through them, credit applicants to assess their ESG risks, and to integrate ESG risk assessment into the risk management processes of financial institutions. Completing the questionnaire also contributes to raising sustainability awareness among stakeholders, which supports the green transition of the domestic economy. Finally, it is important to stress that since this is a set minimum standards, banks are free to include other questions of their own if they consider them relevant to their lending and risk management processes. The text sets out requirements for the collection and assessment of ESG information, while the annex will contain the applicable ESG minimum questionnaire and the related instructions for completion.

**The questions are divided into 4 main themes and several sub-themes.** The first main topic covers general questions to define the basic characteristics of companies, such as size, activity and ownership structure, allowing differentiation by size and industry classification. The second theme is the ESG's 'E' pillar – environmental sustainability –, which is based on the six objectives derived from the European Union's environmental taxonomy<sup>29</sup>. The third set of questions sets out requirements regarding social risks, with a particular focus on specific national circumstances. Finally, the fourth block covers corporate governance issues.

**Objective measurability as well as a risk and database approach are at the heart of the questionnaire.** While developing the questionnaire, the MNB placed great emphasis on formulating questions that are based on quantitative data in order to facilitate objective measurability and objective responses. The series of questions is also risk-based, with questions designed to assess risks, and therefore not necessarily to evaluate

<sup>29</sup> Regulation (EU) 2020/852 of the European Parliament and of the Council

positive activities such as charitable activities. Another criterion is that the answers to the questions should be stored in a database.

**The draft recommendation has been developed through a wide-ranging consultation process.** Building on previous successful collaborations, while formulating its set of questions the MNB discussed it with a number of key organisations with a deep insight into and experience on specific issues. During the professional consultation, the draft was sent to the representatives of the Hungarian Banking Association, the Hungarian Chamber of Auditors, the Business Council for Sustainable Development in Hungary, the Budapest Stock Exchange and the National ESG Council. Numerous useful comments were received from the stakeholders and incorporated into the recommendation.

**The MNB expects the recommendation to be applied in several stages.** The completion of the questionnaire will be introduced gradually in several stages depending on the size of the applicant company and the contract amount. The staggered entry into force will ensure that credit institutions and companies applying for credit have sufficient time to

prepare. The recommendation is expected to enter into force on 1 January 2025.

## 2.5 NEW, REGULAR GREEN DATA PUBLICATION



**The MNB publishes green finance data on a quarterly basis.** As the MNB has built up a significant data asset in the field of green finance over the past three years, and market participants have shown keen interest in learning more about the green data

asset, therefore the Magyar Nemzeti Bank has been publishing key data on green financial products on a regular, quarterly basis since November 2023 on the [Statistics sub-page of its website](#). The publication provides data on the stock of corporate and municipality green loans, portfolios participating in the Preferential Capital Requirements Programme for housing loans and the stock data of other green loans; the historic data series of SFDR funds in the insurance sector, and a list of green securities issued by domestic participants.

### Box 2

#### MNB and OECD joint project to assess financial risks stemming from biodiversity loss

**Accelerating biodiversity loss is a major risk for the economy and the financial sector.** However, measuring these impacts is much more complex than measuring the risks arising from climate change. Measuring the temperature or the concentration of a pollutant in the air is a relatively easy task but measuring, for example, an insect population that is constantly changing in time and space is far more difficult. At present, little – albeit growing – knowledge is available on the risks of biodiversity loss to the financial sector worldwide. This may lead to inaccurate pricing in markets, inappropriate allocation of capital, and overall increased exposure to these risks, with resulting losses that threaten social welfare. Therefore, policymakers, financial supervisors and central banks need to assess the impacts associated with these risks and possible ways to address them more thoroughly than it is currently done.

**In September 2022, the MNB launched a research and methodology project to assess the financial risks of biodiversity loss as part of its Green Programme.** The cooperation, which is planned to last for around two years, is funded by the European Union through the Technical Support Instrument (TSI), with the OECD participating as an implementation advisory partner in the implementation process in cooperation with the European Commission's Directorate General for Structural Reforms (DG Reform).



**Under the project, a supervisory framework for assessing biodiversity-related financial risks must be developed primarily.** In this context, [two materials](#) were issued by the OECD. The first was a comprehensive analysis of options for assessing and measuring biodiversity-related financial risks, published in April 2023. It described the types and transmission channels of biodiversity risks, existing databases and methodologies, and the main challenges<sup>30</sup>. All this was presented in a workshop in April 2023 to more than 260 participants from all over the

<sup>30</sup> <https://www.oecd-ilibrary.org/docserver/d52137a5-en.pdf?expires=1708350776&id=id&accname=ocid56004653&checksum=8CFE52ABDD-250DEC989607920C48ECF3>

world.<sup>31</sup> The second is a dedicated paper for central banks and supervisory authorities, in which a supervisory framework was developed.<sup>32</sup>

**The OECD will make the results of the project available to a broader range of stakeholders.** The OECD will also make the results available to the MNB and representatives of the Hungarian financial system, as well as to central banks and financial supervisory authorities across Central and Eastern Europe. The project is scheduled to be completed in June 2024.

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<sup>31</sup> <https://www.oecd.org/environment/resources/biodiversity/oecd-inspireworkshopassessingbiodiversity-relatedrisksimpactsanddependenciesinthefinancialsector.htm>

<sup>32</sup> <https://www.oecd-ilibrary.org/docserver/a8e4991f-en.pdf?expires=1708347135&id=id&acname=ocid56004653&checksum=3968D82A-2F14CDE4AD1AF098843F91E3>

## 3 Green finance: barriers and incentives

*In recent years, the European Union has shown a growing commitment to sustainability. Not a green finance or sustainability conference in Europe goes by without a focus on the “Fit for 55” package. The EU’s package of 13 legislative proposals aims to achieve a 55 per cent reduction in GHG emissions by 2030 compared to 1990 levels, and eventually net zero emissions by 2050. However, in order to achieve this ambitious plan green financial instruments are essential in providing a financial basis for the green transition.*

*Recent events have shaken up financial markets and the calm environment that had existed before the COVID-19 epidemic has disappeared. Summing up the trends, it is not possible to speak of a clear positive change. While the energy crisis experienced two years ago pushed European countries towards energy independence, there was less emphasis on the need for this energy to be green. This is why the past year has not seen the same dynamics of volume growth in green products as we had seen so far. In several cases, we have seen stagnation or decline in the share of green financial products across Europe (including Hungary).*

*However it should also be noted that we could also speak of positive changes. Regulation, for example, has become one of the most dynamic sectors for maintaining and strengthening investor confidence in green financial products. A similar picture is emerging in Hungary. Market regulation is becoming stronger and more effective, allowing incentives to be both enforced and expanded.*

*This trend was confirmed by the Magyar Nemzeti Bank. It has contributed to the greening of domestic financial institutions through a number of activities in recent years. Notably, the successful Green Preferential Capital Requirements Programme was expanded and extended in 2023, which aims to mitigate transition risks, and to encourage domestic credit institutions to develop green products, both in the corporate sector and among households. While 2023 did not show the same momentum in capital markets as in 2020 or 2021, the future should hopefully see a return of the dynamics seen in the past, which will facilitate and support the sustainability transition.*

### 3.1 TRENDS IN GREEN LENDING

#### 3.1.1 Extension of the Green Preferential Capital Requirements Programme

To support the green transition process further, the MNB decided to extend the Green Preferential Capital Requirements Programme in September 2023. Launched by the MNB in 2021 and extended and amended in several rounds since then, the Green Preferential Capital Requirements Programme is a unique global initiative that provides commercial banks with the opportunity to reduce regulatory capital requirements under Pillar 2 for their environmentally sustainable green bond and green loan exposures that meet the detailed criteria.

The Magyar Nemzeti Bank has announced its Green Preferential Capital Requirements Programmes as part of its Green Programme. With the Green Preferential Capital Requirements Programme, the MNB aims to improve the environmental risk profile of the banking sector, promote green lending through a positive incentive, thereby



supporting efforts to avoid and reduce domestic carbon emissions. Credit institutions participating in the scheme may apply two types of preferential capital requirement: for [green corporate and municipal loans](#) and for [green housing loans](#). The MNB has introduced the programmes in several steps, and has extended the range of exposures covered several times. These amendments and extensions did not change the original time limit for the programmes (31 December 2024).

The 2023 review of the programmes was motivated by two factors. On the one hand, it was time to review the results of the programmes so far and to modify the structural elements of the programmes in ways that can increase their effectiveness further. As a result of the assessment, the Financial Stability Board decided in September 2023 to extend the programmes, to extend the

agreed environmentally sustainable financing targets and to provide some justified administrative relief.

**In 2023 the MNB decided to extend the programme.** Until then, market participants were able to benefit from the preferential capital requirements for loan contracts and bond exposures originated between 1 January 2020 and 31 December 2024. As a result of the extension, the MNB extended the original time limit for contracting (end of 2024) by one year to 31 December 2025, with the provision that any green bank exposure created before that date must serve as a basis for taking recourse to the preferential capital requirement for the first and up to twenty quarters of the term. This change therefore also ensures that eligible exposures can benefit for a full five years, whereas under the previous criteria, the full five-year benefit was only available for exposures that entered the scheme at the start.

**In addition to the extension, the MNB also supported the increase in loan purposes.** Following consultations with peer authorities, professional organisations and lending institutions, the MNB also expanded the range of green loan purposes to promote energy efficiency, the modernisation of electricity networks, energy storage, greener district heating and a broader use of renewable energy (Chart 3.1). The MNB supplemented the corporate energy efficiency loan purposes with an energy efficiency action list and the commercial property loan purpose with a simplified set of conditions for exposures below EUR 1 million in the municipal and SME lending segment.

**The MNB has also made room for administrative simplification.** In the case of the preferential capital requirements for green retail housing loans, the essence of the administrative relief was that it was no longer necessary to prove energy performance with an energy performance certificate before starting renovations if the property was built before 1990 (as there is a very high probability that in these cases the residential building to be renovated is not energy efficient at the start). After the renovation, however, it is still necessary to certify the energy efficiency level.

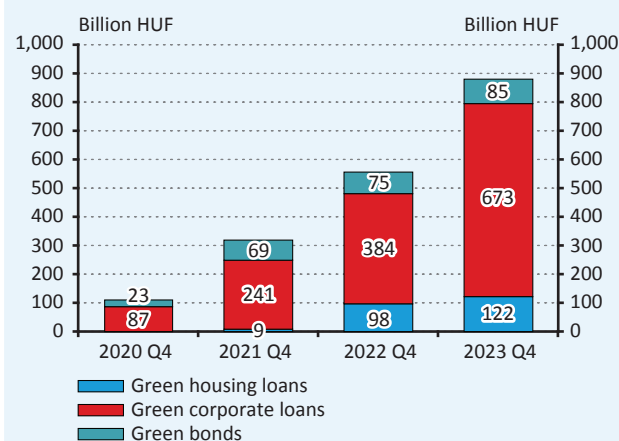
**The programme’s popularity appears unbroken so far.** In view of the innovative nature of the Green Preferential Capital Requirements Programme, the MNB’s enforcement of prudential and sustainability considerations is also complex. This includes limiting the duration of the programmes and maximising the amount of the benefit that can be claimed. Market interest in the programme remains strong: by the end of 2023, preferential capital requirements were claimed after bank exposures amounting to a total of HUF 880 billion. Of this, HUF 85 billion comprised green bonds, HUF 673 billion corporate loans and HUF 122 billion gross exposures for housing loans (Chart 3.2).

**Chart 3.1**  
Environmentally sustainable financing goals of the MNB’s Green Preferential Capital Requirements Programme



Source: MNB

**Chart 3.2**  
Developments in bank exposures over time of the Green Preferential Capital Requirements Programme

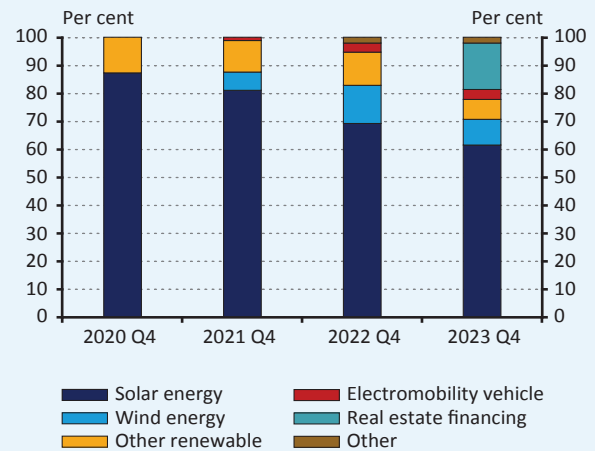


Source: MNB

**The distribution of corporate loans by loan purpose in the Green Preferential Capital Requirements Programme has changed significantly over the years.** While initially (2020 Q4) the loans participating in the Programme were exclusively related to renewable energy production, by the end of 2023 this was expanded to include real estate financing (16.73 per cent) and loans to finance electromobility (3.55 per cent). In addition to the dominance of solar power generation, wind power, which has been very popular in recent years, has gained an increasing share, reaching a gross exposure of nearly HUF 63.4 billion, and its share in the Preferential Capital Requirements Programme amounted to 9.4 per cent. However, it is also worth adding that although the share of solar energy has declined somewhat – due to a 75 per cent increase in total GPCR loans –, it grew by more than 50 per cent in terms of gross exposure in 2023. The volume and thus the share of other renewable energy loans for biomass and geothermal energy production decreased in 2023, which was offset somewhat by the increase in hydroelectricity loans (Chart 3.3).

**In the period since the programme was launched, the MNB has approved the green finance framework of three banks.** For the time being, the concentration of Green Preferential Capital Requirements for retail housing are concentrated in

**Chart 3.3**  
Green Preferential Capital Requirements Programme for corporates and municipalities – breakdown of corporate loans according to loan purpose



Source: MNB

newly built properties, a significant proportion of which are loans under the Green Home Programme. The programmes also have a market and institutional development impact on the financial institutions as a whole. Overall, they act as a strong but achievable green finance standard in Hungary.

### Box 3

#### Empirical analysis of the Green Preferential Capital Requirements Programme for corporates

**The Green Preferential Capital Requirements Programme for corporates (GPCR) provided a unique opportunity to test the green hypothesis empirically.** One of the reasons for launching the scheme was the so-called “green hypothesis”, which claims that green loans are less risky than non-green loans. The data collected continuously since the start of the programme in 2020 will provide an opportunity to back-test the risk of the loans participating in the programme and thus empirically test the green hypothesis. As the first part of a research project, the MNB tested this hypothesis. The analysis covered the two largest exposure groups of the programme, transactions and companies related to renewable energy production and electromobility. The analysis included more than 80,000 companies with loans outstanding, for which a total of approximately 570,000 observations were available. Around 2 per cent of all observations belonged to one of the groups of the preferential programme.

**The analysis covers the default rate using observed default events.** This gives an estimate of the most commonly used and fundamental indicator for measuring credit risk: the probability of default. For the purposes of the assessment, default is defined as bankruptcy in the banking sense, i.e. firms that are more than 90 days in arrears or are designated as non-performing by the banks’ data. While the preferential scheme basically decides at the transaction level whether or not an exposure participates, the analysis looks at firm-level defaults rather than transactions. Thus, claims can be made about the riskiness of the firms that have loans outstanding under the programme. A significant part of the duration of the programme coincided with the institution of the repayment moratorium, but only loans disbursed before March 2020 were eligible for the moratorium. Therefore, limiting the analysis to loans disbursed after that period, the MNB used the default events observed between 2020 Q1 and 2023 Q2 for the analysis.

**The risk of default proved to be lower for companies participating in the programme.** The results show that the proportion of companies in default is significantly lower for renewable energy companies participating in the preferential capital requirements scheme over the period under review, both compared to the overall sample and to other energy companies. Similarly, companies with electromobility-related business have a significantly lower default rate than the total sample or companies with leasing.

**Table 1**

	Total sample	Renewable GPCR	Energy sector	Electromobility GPCR	Leasing
<b>Annualised default ratio</b>	2.9%	0.5%	0.7%	1.1%	2.6%

**This provides justification for the Preferential Capital Requirements Programme.** Further research is needed to test whether firms with green credit are less risky after controlling for all other relevant credit risk factors. In addition, it will be important to monitor whether this significant risk difference persists beyond the period under review. The MNB has also examined the risk gap using econometric methodology, on which it will publish a working paper later this year.

### 3.1.2 Green Preferential Capital Requirements for housing loans

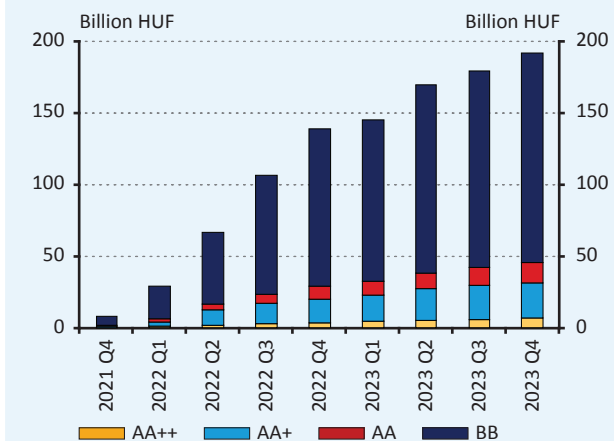
**In 2023, the stock of housing loans participating in the Green Preferential Capital Requirements Programme continued to grow dynamically.** In 2023 Q4, the outstanding principal amount of green housing loan exposures of credit institutions participating in the Programme reached HUF 191.67 billion (HUF 123.11 billion in terms of gross exposure), representing annual growth of 37.98 per cent from HUF 138.91 billion (HUF 97.53 billion in gross exposure terms) outstanding in 2022 Q4. The volume of housing loans participating in the Programme increased sharply, while total housing loans to households in terms of outstanding principal debt increased by only 1.96 per cent in 2023 due to the rising interest rate environment and the phasing out of the MNB's Green Home Programme in the previous year. The outstanding principal of green home loans under the Preferential Capital Requirements programme reached 3.82 per cent of total residential housing loans at the end of 2023, an increase of 0.97 percentage points over the previous year's 2.82 per cent.

**There is still plenty of room for energy efficiency renovation of second-hand housing.** In addition to the modification of the Programme due to the changes in the legislation on the energy performance of buildings, the MNB has eased the conditions for participation of the renovation of used residential buildings during 2023. For residential buildings built before 1990, it is not necessary to provide an energy performance calculation to support the initial energy classification of the buildings to be renovated (Chapter 3.1.1). It is sufficient to prove the fulfilment of

the conditions for participation in the Programme with the technical documentation of the planned condition and the final certified energy certificate after the loan purpose has been implemented. Currently, the Programme only covers loans for the construction or purchase of new, energy-efficient property, renovation loans are not covered yet. The MNB is confident that the easing of conditions in 2024 will encourage the introduction of renovation loans in the Programme, which would also contribute to improving the energy efficiency of the Hungarian housing stock.

**The largest share of the Programme is made up of BB-rated financed properties.** Newly built properties with an energy rating of BB – i.e. those meeting the near-zero

**Chart 3.4**  
Outstanding principal of green housing loans participating in the Programme, broken down by the energy classification of the financed buildings



Source: MNB

energy (NZE) requirements – have accounted for the largest share of loans in the Green Preferential Capital Requirements Programme so far<sup>33</sup> (Chart 3.4): At the end of 2022 loans financing real estate with an energy rating of BB represented 78.9 per cent in principal outstanding. This

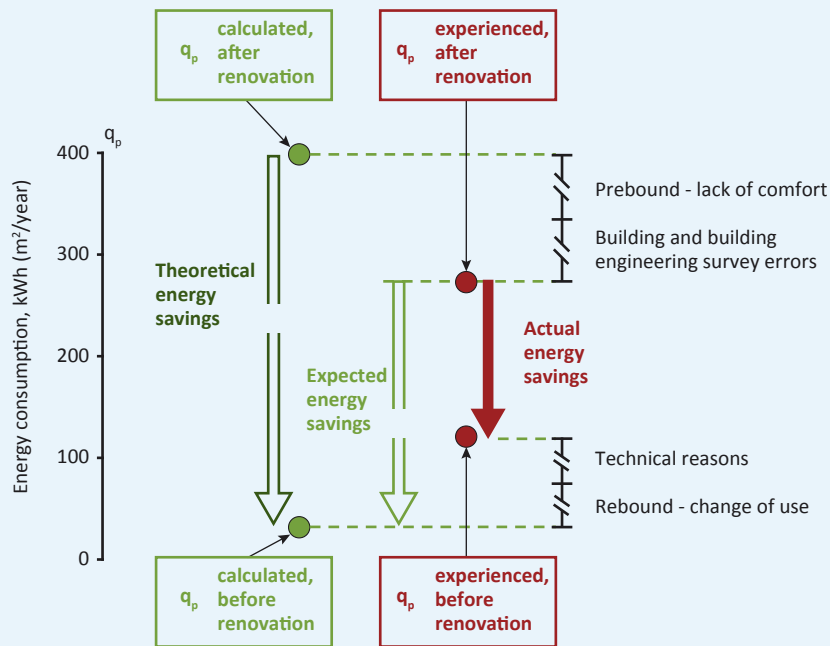
ratio decreased by 2.63 percentage points by the end of 2023, mainly due to the gradual increase in AA+ properties – i.e. those with exceptionally high energy-efficiency –, the share of which reached 12.84 per cent by the same date.

**Box 4**  
**Impact of behavioural patterns on energy efficiency**

**The energy efficiency of residential buildings is becoming an increasingly central issue, which is also reflected in the number of related studies.** This is why the Magyar Nemzeti Bank invited Gyula Gróf, professor emeritus, to give a presentation on building energy efficiency at the Green Finance Conference. Experience demonstrates that the effectiveness of energy efficiency investments is below what was expected in the preliminary assessments, for four reasons overall (Chart 3.5):

- I. inadequate knowledge of the condition before renovation
- II. under-heating or lack of comfort
- III. technical reasons arising during the renovation, and
- IV. use after renovation.

**Chart 3.5**  
**Components of the creation of the energy efficiency gap**



Source: Davide Cali<sup>34</sup>

<sup>33</sup> For the purposes of the analysis, we applied the energy ratings used in TNM Decree No. 7/2006 (V. 24.) on the specification of the energy performance of buildings. The TNM Decree was replaced in November 2023 by Decree No. 9/2023 (V. 25.) of the Ministry of Construction and Transport on the specification of the energy performance of buildings. For the time being, only those transactions are included in the Green Preferential Capital Requirements Programme for housing purposes that are classified as A+ 2023 under the new energy rating, which broadly corresponds to the former AA category, and is therefore included in the portfolio classified into the AA category.

<sup>34</sup> Cali, D., Osterhage, T., Streblov, R., & Müller, D. (2016). Energy performance gap in refurbished German dwellings: Lesson learned from a field test. Energy and buildings, 127, 1146-1158.



**The projected energy savings are not realised mainly because our energy consumption does not solely depend on the physical condition of the property.** Before renovation, we often heat the property to a lower temperature than what feels comfortable (prebound) to keep costs under control, while after renovation we set the temperature to a comfortable level, which results in additional consumption (rebound).

**In addition to behavioural biases, measurement errors can also distort expectations.** People tend to overestimate their pre-renovation consumption, leading them to expect higher savings. The assessment of buildings is not without error, and it is possible that the project may not go ahead as planned. Finally, it should also be remembered that during renovation you may encounter technical problems, which may be due to an inadequate building assessment.

**Energy efficiency decision-makers need to address these behaviours in order to achieve the expected results.** The projected energy savings will be realised if the preliminary calculations are based on credible and consistent data. Furthermore, those working on energy efficiency improvement programmes need to take into account prebound and rebound effects to ensure that the expected results are realised; otherwise, the actual figures will always be different from the expected ones.

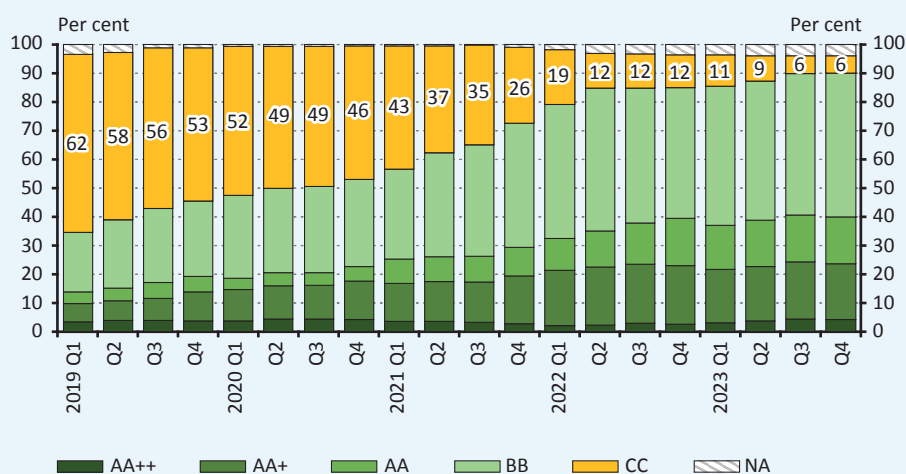
### 3.1.3 Energy efficiency in the domestic real estate and credit market

Since 2022, there has been a significant improvement in the condominium market of Budapest in terms of “green”, or NZE, compliance. In Hungary, according to the current regulation governing the energy performance requirements of buildings<sup>35</sup>, new buildings will have to comply with the near-zero energy demand (NZE) for occupancy permits requested after 30 June 2024. According to the MNB’s estimates, in 2023 Q4 90 per cent of new condominium apartments for sale in Budapest had an energy rating of BB

or better, i.e. they meet the NZE requirement. This ratio was 73 per cent at the end of 2021 (Chart 3.6).

From January 2024 new building energy rules and new types of energy performance certificates came into force. This may foster the modernisation of the domestic stock of dwellings and the better identification of its energy efficiency. Significant changes in energy certification are coming into effect from 2024: the current scale from AA++ to JJ will be changed to A+++ to I, and the classification into these categories will also be based on carbon dioxide emissions in addition to the aggregate energy performance

**Chart 3.6**  
Distribution of flats in new condominium projects under sale in Budapest by estimated energy rating



Note: Based on 4-flat or larger condominiums. Estimated energy efficiency classifications: where the energy efficiency is unknown, we used category BB for renewable energy, and category CC for all other.

Source: ELTINGA – Housing Report, MNB calculations.

<sup>35</sup> Decree No. 9/2023 (V. 25.) of the Ministry of Construction and Transport on the specification of the energy performance of buildings.

used so far. The new energy performance certificate not only assesses the energy performance of the building as a whole, but also the energy performance of individual technical systems and building components.

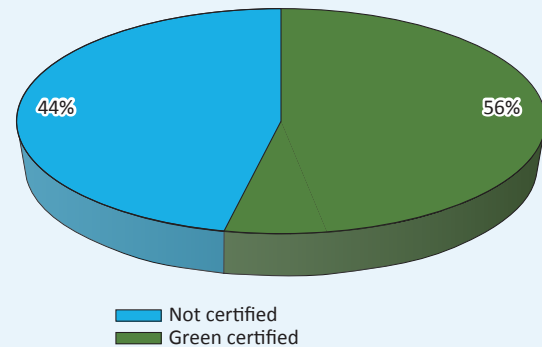
**Besides newly built properties, there is also an increasing focus on renovating existing ones.** In terms of subsequent upgrades, the owner can also benefit from a detailed proposal for the appropriate technical sequence of renovation and upgrading works, which also facilitates the implementation of phased renovations. During the rating, the energy auditor will issue two types of recommendations: one for renovation to a cost-effective level and one for renovation to a near-zero requirement level. For newly delivered buildings, the near-zero energy requirement is reduced from 100 kWh/m<sup>2</sup>/year to 76 kWh/m<sup>2</sup>/year, but the calculation method has also been modified. The mandatory 25 per cent renewable energy share requirement for new buildings will be replaced by a mandatory cap on specific carbon dioxide emissions (20 kg/m<sup>2</sup>/year); however, the use of renewable energy is essential to achieve this.

**In the next two years, the share of green-certified office space in the Budapest office market could rise to 60 per cent.** On the financing side, the MNB's extended and expanded Green Preferential Capital Requirements for corporates and municipalities will continue to encourage this. In terms of tenant needs, the sustainability of office buildings has become a key consideration in recent years and has moved up on the list of factors determining rental decisions. According to the CBRE's survey published in June 2023<sup>36</sup>, 55 per cent of tenant respondents in Europe and 58 per cent in the CEE region reported that the sustainability features of office buildings were key factors in decision-making. In 2022 this rate was 44 per cent, and in 2021 it was 37 per cent.

**In Budapest, the modern office stock amounted to 4.37 million square metres at the end of 2023**, 56 per cent of which (2.4 million square metres) had BREEAM, DGNB, LEED or WELL certification<sup>37</sup> (Chart 3.7). All submarkets in the Budapest office market have green office space, with the majority of this space concentrated in the Váci út office corridor, the Pest Centre, South Buda and Buda Centre submarkets, as these submarkets have seen significant volumes of new developments in recent years. Based on the developments under construction, around 410,000 square metres of new office space will be completed in

the next two years, which will increase the share of green office space in Budapest to 60 per cent. In addition, the MNB's Green Preferential Capital Requirements Programme for corporates and municipalities – which is described in more detail in Section 3.1.1 – is an incentive to improve the sustainability of the commercial real estate stock.

**Chart 3.7**  
**Composition of the modern office stock in Budapest according to green rating**



*Note: Green office stock includes modern office buildings in Budapest with BREEAM DGNB, LEED or WELL certification. Based on end-2023 data.*

*Source: CBRE*

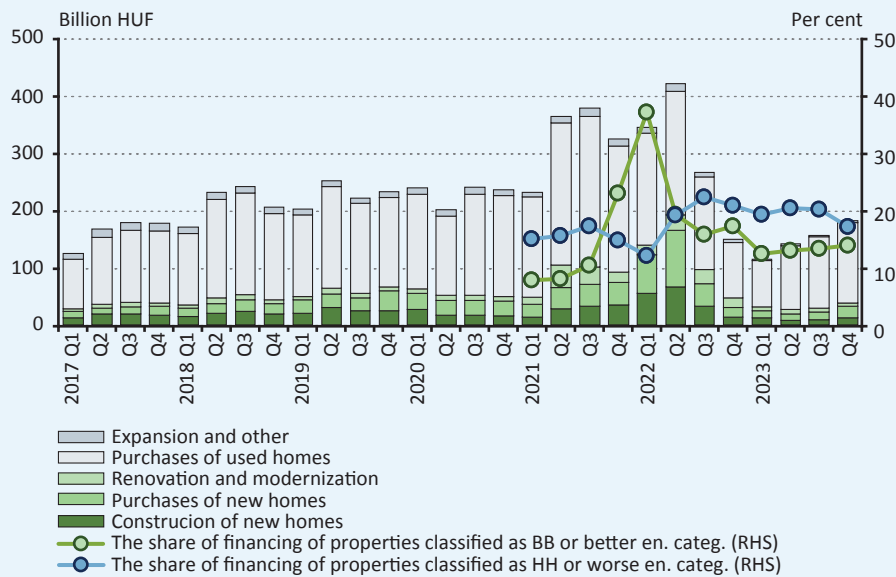
**Increased renovation activity could effectively support improvements in the sustainability of commercial real estate.** Given that 60 per cent of the carbon emissions associated with the construction of buildings are linked to the main building structure, which has a life expectancy of up to 100 years, renovating existing, outdated and under-utilised buildings could improve the sustainability of the stock while reducing emissions.

**Following the phase-out of the Home Renovation Support, the volume of loans for renovation and modernisation has fallen significantly.** In 2023, housing loan disbursements of credit institutions fell by 50 per cent compared to the volume issued in 2022. All housing purposes were affected, but the largest decline of around 75 per cent was observed in loans for the construction and purchase of new housing. With the phase-out of the Home Renovation Support in December 2022, the subsidised home renovation mortgage loan was also discontinued, and the demand for this loan could not be offset by the market-based mortgage loans available at the increased interest rates. Moreover, in an uncertain economic environment combined with high

<sup>36</sup> CBRE Research: Office Occupier Sentiment Survey, June 2023.

<sup>37</sup> For more details on green building ratings, see Box 1 of the Commercial Property Market Report, October 2021

**Chart 3.8**  
Distribution of newly disbursed housing loans by loan purpose



Source: MNB

inflation and falling demand for credit, the volume of housing loans for renovation and modernisation fell by a third in 2023 compared to the previous year (Chart 3.8). While in 2022 Q1, when the FGS GHP surged, around 37 per cent of new loans financed the purchase or construction of a property with an energy rating of BB or better, after the

phase-out of the programme, this rate dropped to close to 13 per cent. In addition, further increases in house prices and financing costs have led to a shift towards cheaper but less energy-efficient properties. Around 20 per cent of the loan volume disbursed in 2023 was used to finance homes with an energy performance certificate of HH or worse.

### Box 5 Estimating the energy demand of the housing stock in Hungary

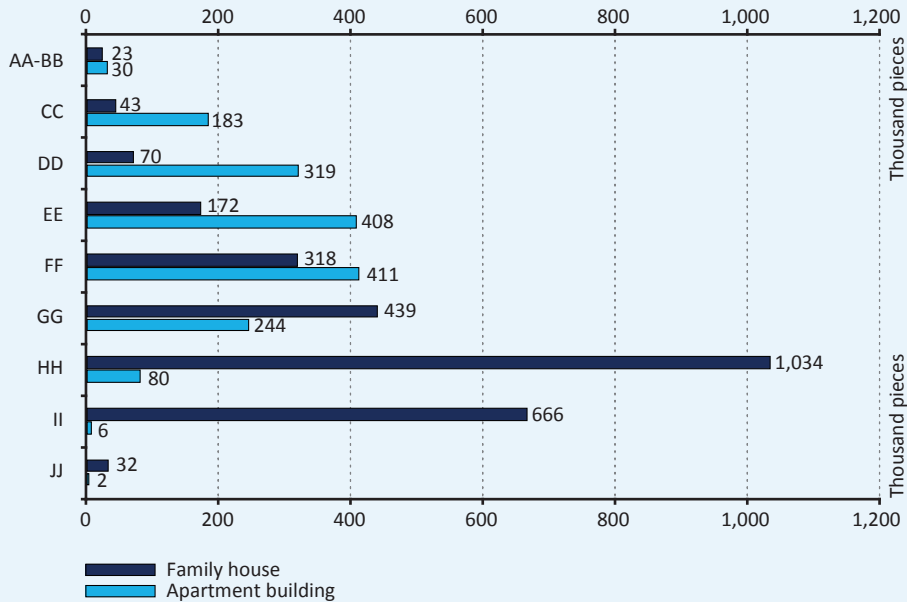
**The MNB appointed the KSH-MEHI-ELTINGA research team to assess the energy efficiency of domestic residential properties and to develop a methodology for its evaluation.** The researchers have conducted several studies and research on the topic, and their latest study was published in the autumn 2023 issue of the Financial and Economic Review<sup>38</sup>, in which they estimated the distribution of the calculated energy demand of the Hungarian housing stock in 2020. A new database has been compiled by linking the energy certificates issued since 2016, the 2016 microcensus and the housing statistics of the HCSO. A statistical relationship between housing characteristics and energy demand was established and projected to the whole stock. Based on this estimate, the calculated specific energy demand of the Hungarian housing stock was also presented.

**The estimated distribution shows a less favourable picture than the certificates issued.** This result is not surprising, as the properties that are put on the market generally have better energy performance than the stock as a whole. While the most common category among the certificates issued is *CC*, the most common category in the stock is estimated to be *HH*. This distribution is mainly the result of the *HH* category dominating in detached houses. In the case of family houses, category *II* is also typical, with an estimated 650,000 or more such houses in Hungary, while the *GG* and *HH* categories include approximately 1.5 million homes out of 2.8 million family houses. Although the

<sup>38</sup> Bene, M. – Ertl, A. – Horváth, Á. – Mónus, G. – Székely, J. (2023): Estimating the energy demand of the Residential Real Estate Stock in Hungary. *Financial and Economic Review*, 22(3), pp. 123–151.

AA-BB-CC category accounts for 20 per cent of the certificates, the projection for the stock shows that only 3 per cent of the family houses in Hungary were in the “modern” or better energy category at the end of 2020 (Chart 3.9).

**Chart 3.9**  
Distribution of estimated energy classification of houses and apartments in Hungary



Source: Calculated based on the merged database and the Microcensus.

Based on the entire dwelling stock prediction, the lower bound of the top 15 per cent of the energy efficiency of residential properties in Hungary can be estimated. Although there is no universally agreed rule on what is considered “green” for residential property lending, there is consensus that – even under EU legislation – a property must be in the top 15 per cent of energy efficiency in the country concerned<sup>39</sup>. Since a simultaneous and thorough expert survey of all domestic properties is essentially impossible, the study also contributes to the estimation of the distribution of energy demand of residential properties in Hungary.

### 3.1.4 Sustainability in transport – financing electromobility

Reducing GHG emissions from transport is an important component of the sustainable economic transition. The focus is not a coincidence, as 12 per cent of the EU’s carbon emissions come from cars and a further 2.5 per cent from vans and vans used by the public<sup>40</sup>. From 2025, Regulation (EU) 2019/631 of the European Parliament and of the Council<sup>41</sup> sets increasingly stringent EU-wide CO<sub>2</sub> emission targets: a 15 per cent reduction for both cars and vans by 2025, and a 50 per cent reduction target

for vans and a 55 per cent reduction target for cars from 2030 compared to the 2021 baseline. It also sets a zero carbon-dioxide emission target for new cars and vans from 2035. In order to meet these targets, the share of electric vehicles in the European vehicle fleet will need to increase significantly.

The year 2023 was decisive in the rise of purely electric, i.e. battery-powered (BEV) cars. These models became the third most popular car type among European buyers, overtaking diesel cars for the first time<sup>42</sup>. Sales of purely electric cars increased by 37 per cent in the EU. In numbers,

<sup>39</sup> There are tools to improve the energy performance of Hungarian real estate

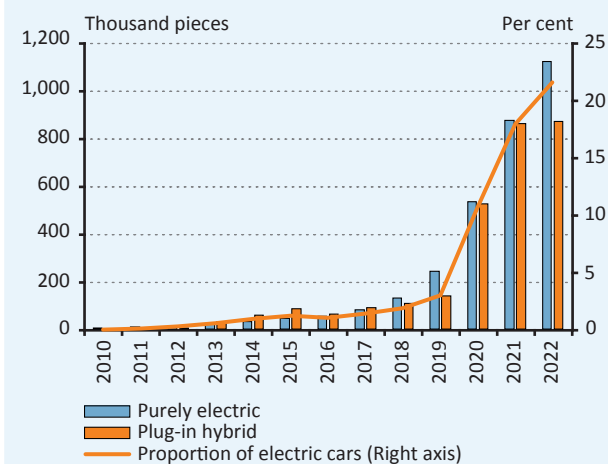
<sup>40</sup> CO<sub>2</sub> emission performance standards for cars and vans - European Commission (europa.eu)

<sup>41</sup> EUR-Lex - 02019R0631-20240101 - EN - EUR-Lex (europa.eu)

<sup>42</sup> E-Mobility Europe: An Overview of Europe’s Latest Electric Vehicles Data (statzon.com)

this translates to more than 1.5 million vehicles sold. As a result, their market share rose to 14.6 per cent from 12.1 per cent in 2022. At the same time, the EU market share of plug-in hybrid electric vehicles (PHEVs) declined from 9.4 per cent in 2022 to 7.7 per cent (Chart 3.10).

**Chart 3.10**  
Sale of new electric cars, EU-27



Source: Eurostat

### Pure electric vehicles are becoming increasingly popular.

The ratio of purely electric to plug-in sales shows that the electric vehicle market has shifted towards pure electric models. Last year, purely electric cars accounted for two-thirds of all electric vehicles sold globally. In 2021, plug-in hybrids still dominated nearly half of the electric car market. The electric vehicle fleet in the EU also reflects this shift, with 4.7 million purely electric cars and 3.4 million plug-in models in 2023. Despite the overall positive picture, December 2023 presented significant challenges, especially in Germany, Europe's largest car market. There has been a dramatic drop in the sales of new electric vehicles, the first decline in the EU since the beginning of 2020. Two weeks before the end of the year, subsidies for electric vehicles were drastically reduced in Germany (up to EUR 4,500 had been available in state subsidies for the purchase of purely electric vehicles), leading to stagnating sales<sup>43</sup>.

**The global electric vehicle market has been absolutely dominated by China in recent years.** According to the

Harvard Business Review study<sup>44</sup>, electric car sales in China grew by 82 per cent in 2022, accounting for nearly 60 per cent of global sales that year. The study identifies three factors as drivers for the electric passenger car industry:

- I. Experimentation and development in other electromobility industries (BYD has been pushing the limits of battery technology since 2009 in the context of the development of electric city buses).
- II. Supporting practical solutions and collaborations (electric car manufacturers have worked with city taxi companies to develop the charging system).
- III. Focus on the core technology, the battery (which accounts for up to 30–40 per cent of the production cost of a purely electric car).

**In February this year, a call for public tenders was published in Hungary to support the purchase of electric cars co-financed by the EU.** Under this scheme, companies and individual entrepreneurs based in Hungary can apply for up to HUF 4 million in state subsidy, depending on the type and performance of the vehicle, which will be paid out to the winners in the form of post-financing<sup>45</sup>.

### Electric vehicles are also gaining ground in Hungary.

However, the Hungarian electric car fleet is still predominantly made up of plug-in hybrids (Chart 3.11). This low purely electric share is partly explained by the level of development of the domestic network of electric charging stations. Despite this steady growth, by the end of 2022 only 2,147 charging stations were available nationwide, for a total of 4,434 chargers. The distribution of charging stations in the country is characterised by the fact that they are concentrated mainly in the more economically developed and populated settlements, with almost half of the charging stations located in Budapest and Pest County. In 2023, plug-in hybrids accounted for 4.8 per cent of the Hungarian vehicle fleet, while purely electric cars accounted for 1 per cent. In Hungary, it is particularly important to make the vehicle fleet greener and up-to-date: according to the Hungarian Central Statistical Office, the average age of cars in Hungary will reach 15.8 years in 2023, continuing the declining trend of the last decade<sup>46</sup>.

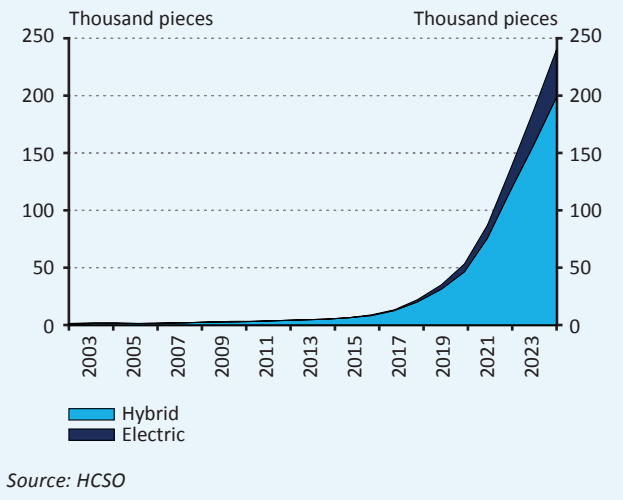
<sup>43</sup> Abrupt end to German electric car subsidies fuels doubts about green mobility target | Clean Energy Wire

<sup>44</sup> 3 Drivers of China's Booming Electric Vehicle Market (hbr.org)

<sup>45</sup> The most important things to know about the state support for electric cars – Electric cars (villanyautosok.hu)

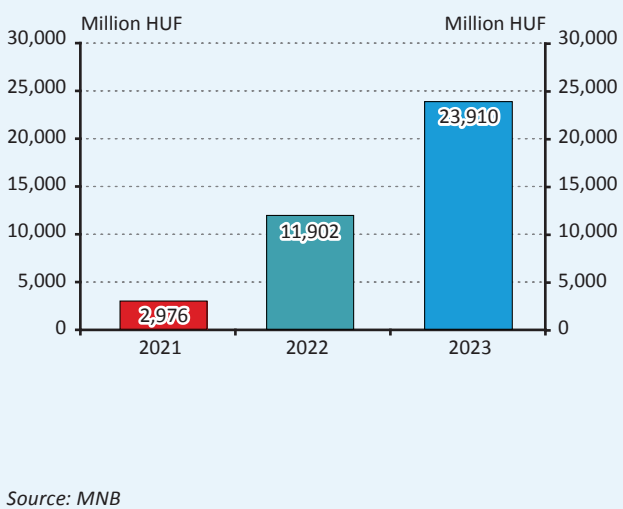
<sup>46</sup> 24.1.1.26. Average age of passenger car fleet by make (ksh.hu)

**Chart 3.11**  
Domestic stock of hybrid and purely electric vehicles



The MNB also supports the financing of electromobility by creating more favourable credit lending conditions. From 2021 it extended its Green Preferential Capital Requirements Programme for corporates and municipalities to cover credit and lease exposures financing electromobility. The expansion of the programme in this segment has proved successful, as by the end of 2023 the programme was applied to bank exposures financing electromobility in an amount of nearly HUF 24 billion. This means that the dynamic growth of the stock concerned continues unabated (Chart 3.12), with an increase of 101 per cent in 2023 compared to the stock at the end of the previous year.

**Chart 3.12**  
Evolution of exposures financing electromobility in the MNB’s Green Preferential Capital Requirements Programme



## 3.2 GREEN CAPITAL MARKET

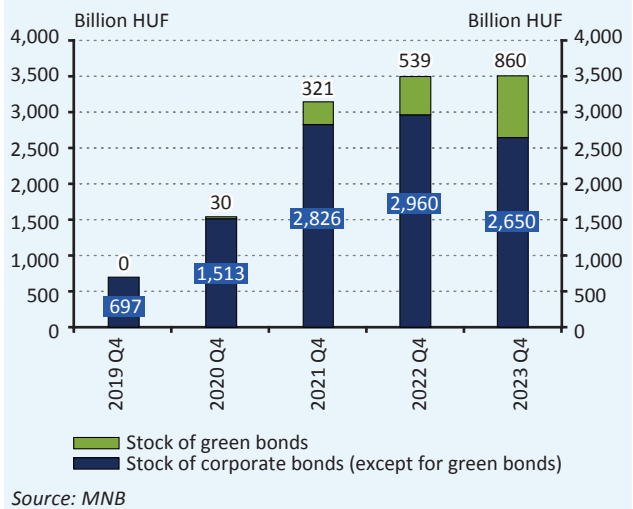
### 3.2.1 Green corporate bond market

After 2019, the Hungarian corporate bond market started to grow dynamically. At the same time, demand for sustainable financial products also increased. The Bond Funding for Growth Scheme (BFGS) has made a major contribution to the development of the corporate bond market, including the proliferation of green securities. Although the central bank did not explicitly set a green target when it launched the BFGS, it has contributed in an intrinsic way to the emergence of the green corporate bond market segment. Green bonds differ from conventional bonds mainly in that they are used exclusively to finance investments that have some direct or indirect environmental and climate benefit.

The first domestic green corporate bond was issued under the auspices of the BFGS. The 2020 green bond of CPI Hungary Investments Kft., a real estate rental and operation company, was followed by others and the green bond market started to grow dynamically. Under the programme, the MNB purchased 114 bond series, 22 of which are certified green bonds. In nominal terms, green bonds purchased by the MNB account for nearly 21 per cent of the portfolio.

An encouraging sign is that green bonds have also been issued outside of the programme. There have been 133 corporate bond issues since 2020, of which 24 series have

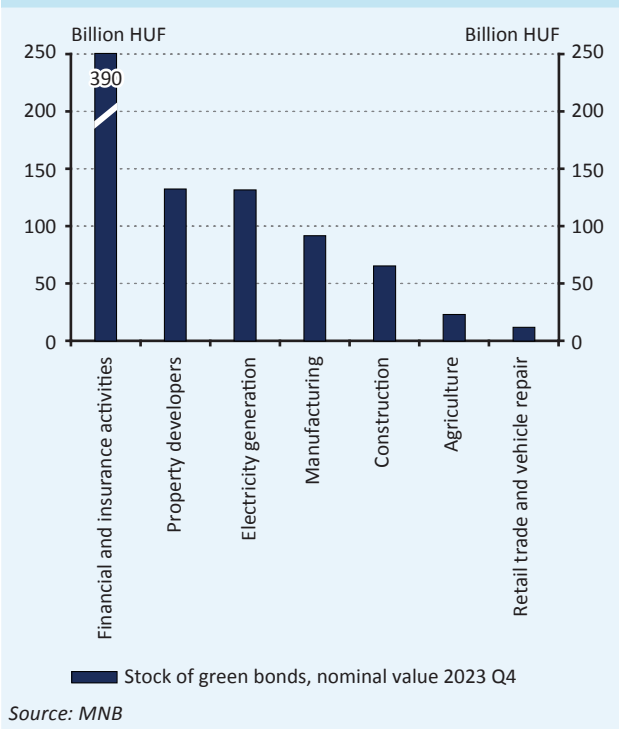
**Chart 3.13**  
Developments in the portfolio of green bonds and other non-financial corporate bonds, based on nominal value



obtained green certification. Furthermore, while the stock of traditional non-financial corporate bonds declined in 2023, the stock of green bonds continued to increase. The nominal value of last year's corporate bond issuance amounted to HUF 307.68 billion. In nominal terms, the share of green bonds in stock of corporate bonds was 24 per cent at the end of 2023, which is high by international standards (Chart 3.13).

**The sectoral distribution of green bond issuance is heterogeneous.** The bulk of domestic green bonds was issued by real estate, electricity, gas, steam and air conditioning. Although the sectoral distribution is dominated by financial and insurance activities (Chart 3.14), these companies also include a high proportion of asset managers, operating mainly in the electricity and real estate sectors. Two companies in this sector also issued foreign currency bonds outside of the BFGS programme in 2023, further increasing the share of stocks issued by the financial and insurance activities sector. Other major domestic green bond issuers include manufacturing and construction.

**Chart 3.14**  
Stock of green bonds by economic sector, nominal value 2023 Q4



**An important milestone is the adoption of the Regulation on European Green Bonds by the Council of the European Union<sup>47</sup>.** It aims to facilitate capital flows to sustainable projects, thereby facilitating the transition to a climate-neutral economy. The Regulation sets out the conditions that securities must meet in order to qualify as a "European Green Bond". The new framework is expected to improve the comparability of bonds and reduce the risk of greenwashing, thereby increasing investor confidence in green securities.

**The spreading of the European Green Bond Standard may have a positive impact on the green bond market.** It is expected to boost investor confidence in green bonds. While an internationally uniform definition and regulation of green bonds is still to be developed, in 2014 the ICMA (International Capital Market Association) laid down the GBP (Green Bond Principles), which is currently one of the most widely used standards in the European market. Resident corporate green bonds are also predominantly aligned with the ICMA GBP.

**In addition to green bonds, new product types are expected to appear on the market of sustainable financial instruments in Hungary.** As it is capable of filling a market niche, sustainability-linked bonds (SLBs) are gaining international popularity. Green bonds are linked to purely environmentally friendly projects and, as such, they are unavailable as a source of funding in some industries. Yet, it is paramount for the green transition that companies in polluting sectors, such as energy and chemicals, also reduce their emissions. This problem is addressed by SLBs, which are linked to specific and measurable sustainability commitments at company level. If a company fails to achieve its targets, for example 1) a committed reduction in carbon emissions or 2) a committed amount of renewable energy production within the specific time limit, the financial terms of the bond change. Most commonly, the interest rate increases by a predetermined amount. In this way, the SLB links the issuer's financial interests to its sustainability efforts, while also allowing the issuer to demonstrate its commitment to achieving its sustainability goals. On the other hand, a considerable rate of 'penalty' boosts investor confidence. Although such an instrument is yet to appear on the Hungarian bond market, it is a financial market product that could be of considerable interest alongside (or

<sup>47</sup> European Green Bond Standard, EuGB

as a complement to) green bonds and could move the green transition to a new level, by motivating polluting industries to make their production processes greener.

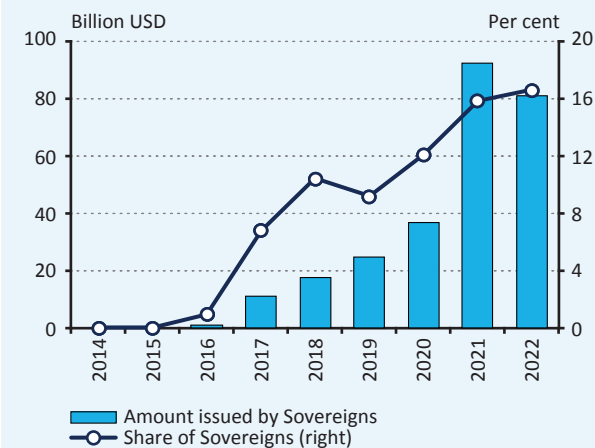
### 3.2.2 Green government bonds

**The volume growth dynamics of green bonds issued by sovereigns has also decelerated.** In line with the global decline in green bond issuance, sovereign green bond issuance in 2022 was also lower than in the previous year, although the share of these bonds increased slightly. According to the Climate Bonds Initiative, the negative impact of the Russia–Ukraine conflict on capital market activity has not left thematic bonds unscathed. Their issuance in 2022 was down 24 per cent on the previous year, but – similar to 2021 – still accounted for 5 per cent of global bond issuance in relative terms. In 2022, sovereigns issued USD 81 billion in green bonds, which amounted to 16.6 per cent of the total green bond stock issued in 2022, compared to 15.8 per cent in 2021 (Chart 3.15). This is still below the share of total (green and other) government bonds in the global bond portfolio<sup>48</sup>. In addition, sovereigns issued USD 20 billion of sustainability bonds in 2022 following a USD

15 billion issue in 2021, while no social bonds were issued in 2022. The rise of sustainability bonds, which can be used for both environmental and social purposes, may have contributed to the decline in issuance of both of these more specific bonds, while the disappearance of the new issuance of dedicated social bonds may also be linked to the phase-out of COVID measures.

**Hungary renewed its Green Bond Framework in July 2023<sup>49</sup>.** The update of the first Green Bond Framework of May 2020 was necessary partly because the external independent second opinion on the Green Bond Framework and the issuances under this framework, prepared by the green bond rating agency CICERO<sup>50</sup>, was for a period of three years, and therefore expired in May 2023. On the other hand, the new framework will ensure that green bond issuances or reopenings are in line with best market practice, European regulatory developments and investors' rising expectations. To this end, the renewed Framework takes into account the Green Bond Principles of 2021 (with Appendix 1 of 1 June 2022) published by the International Capital Market Association (ICMA)<sup>51</sup>, the EU Taxonomy Regulation<sup>52</sup>, the EU Climate Delegated Act<sup>53</sup>, and the EU Green Bond Standard Regulation (EuGBS)<sup>54</sup>, the adoption of which was still in progress at the time of preparing the Framework. With regard to Japanese and Chinese issuances, the Japanese<sup>55</sup> and Chinese<sup>56</sup> green bond guidelines were also taken into account. In the new Framework, the green categories of Eligible Green Expenditures were extended: Clean Transportation, Land Use and Living Natural Resources, Energy Efficiency (including Green Buildings), Renewable Energy, Climate Adaptation (formerly: Adaptation) were retained, while Pollution Prevention & Control and Sustainable Water & Wastewater Management were added as separate green sectors (formerly Waste and Water Management was a separate category), and "Research, Development & Awareness Raising" was added as a new green sector. Mornigstar Sustainability was appointed to certify the renewed Framework. Based on the independent second opinion, the Framework is credible, it is in line with the ICMA Green Bond Principles of 2021, and the projects financed are expected to have a positive impact

**Chart 3.15**  
Developments in the volume of green bonds issued by sovereigns and their share in total annual green bond issuance



Source: Climate Bonds Initiative

<sup>48</sup> According to BIS data, the share of government securities in outstanding debt securities at the end of 2022 was 42 per cent (based on data for countries accounting for 83 per cent of global GDP, excluding international organisations)

<sup>49</sup> [Green Bond Framework Hungary, July 2023](#)

<sup>50</sup> [CICERO: Hungary Green Bond Second Opinion, 25 May 2020](#)

<sup>51</sup> [ICMA: Green Bond Principles](#)

<sup>52</sup> [EU Taxonomy Regulation](#)

<sup>53</sup> [Climate Delegated Act](#)

<sup>54</sup> [EU Green Bond Standard Regulation](#)

<sup>55</sup> [The Japanese Ministry of Environment: Green Bond Guidelines Green Loan and Sustainability Linked Loan Guidelines \(currently only available in Japanese\)](#)

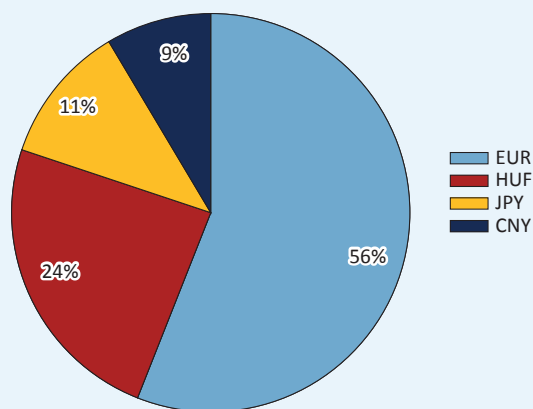
<sup>56</sup> [China Green Bond Standard Committee: China Green Bond Principles \(currently only available in Chinese\)](#)



on the environment. Among the green categories of Eligible Green Expenditures, Renewable Energy is fully aligned with the EU Taxonomy Regulation, while Clean Transportation is partially aligned with – i.e. complies with the provisions of – the EU Taxonomy Regulation.<sup>57</sup>

**During 2023, the Government Debt Management Agency (ÁKK) issued green bonds in an amount of only HUF 76 billion net, down from previous years.** And the issue was limited to the domestic forint market. HUF 57 billion of the 10-year 2032/G HUF bond and HUF 19 billion of the 30-year 2051/G HUF bond were issued. Unlike in previous years, in 2023 international green bonds were not issued, but the share of green government bonds in foreign currency remained dominant (76 per cent) at the end of 2023 (Chart 3.16). The share of green government bonds in total government bond holdings in Hungary was 3.6 per cent at the end of 2023. In Europe, only Ireland, the Netherlands, Sweden and Denmark had higher rates<sup>58</sup>. However, the share of Hungarian green government bonds is still significantly below the 24 per cent nominal share of green bonds issued by domestic non-financial corporations in their total bond issuance.

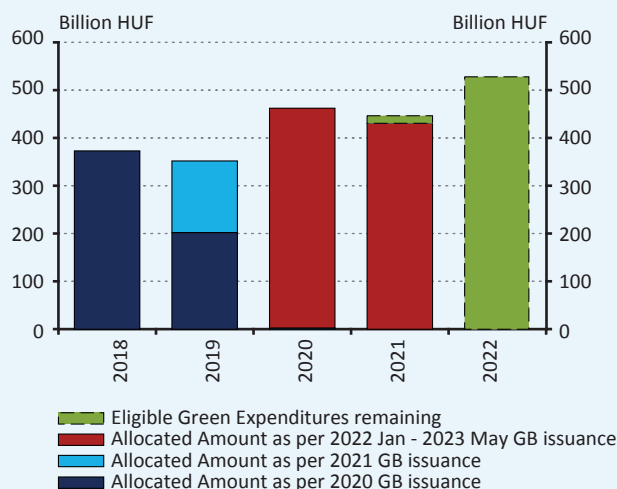
**Chart 3.16**  
Breakdown by currency of green bond outstanding amount at the end of 2023 (nominal value)



Source: ÁKK, MNB

**Green bond issues between the beginning of 2022 and May 2023 refinanced green expenditures incurred in 2020 and 2021.** Besides the 2019 Eligible Green Expenditures, the funds raised from the 2021 green bond issue also financed a small part (HUF 2 billion) of the 2020 expenditures<sup>59</sup>. The 2022 Integrated Report<sup>60</sup> examines the allocation and impact of green bond issuance between 1 January 2022 and 31 May 2023, rather than the calendar year 2022, and thus covers the period up to the expiry of the external independent second opinion on the previous Green Bond Framework in May 2023. The HUF 887 billion received from green bond issuance in this period was allocated to the remaining HUF 457 billion of expenditures from the previous allocation in 2020 and the bulk of the Eligible Green Expenditures in 2021 (HUF 430 billion). The proceeds from issues after May 2023 may be allocated to the remaining HUF 15 billion of 2021 expenditures, plus the HUF 527 billion of 2022 Eligible Green Expenditures<sup>61</sup> shown by the preliminary data (Chart 3.17).

**Chart 3.17**  
Allocation of proceeds from Green Government Bonds to Eligible Green Expenditures by the year incurred



Source: Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2021; Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022; MNB

<sup>57</sup> Mornigstar Sustainalytics: Second-Party Opinion, Hungary Green Bond Framework

<sup>58</sup> Based on Bloomberg data, and calculated on the basis of data from the ÁKK for the Hungarian share

<sup>59</sup> Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2021

<sup>60</sup> Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022

<sup>61</sup> The Eligible Green Expenditures in the 2022 Integrated Report published in 2023 is based on the 2020 Framework Programme, while in the 2023 Integrated Report – to be published in 2024 – Eligible Green Expenditures are calculated based on the criteria of the 2023 revised Framework.

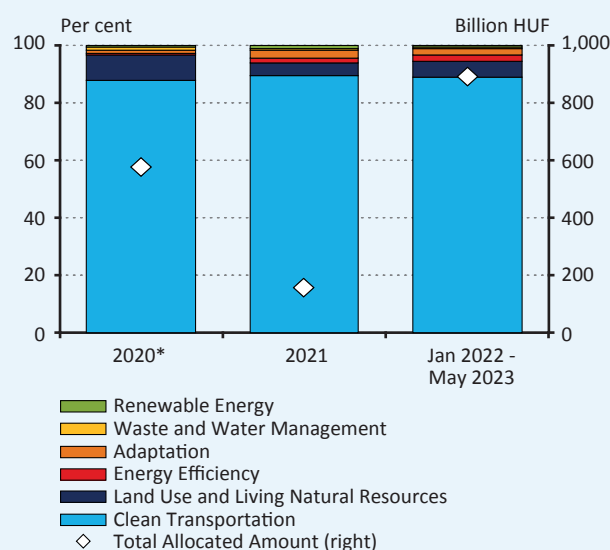
**89 per cent (HUF 791 billion) of the proceeds from the green bond issuance between January 2022 and May 2023 were allocated to Clean Transportation expenditures.** Based on the 2022 Integrated Report, the funds from issues between January 2022 and May 2023, as in previous years, refinanced mainly Clean Transportation expenditures among the six green sectors (Chart 3.18). Out of the HUF 791 billion allocated to this category, HUF 756 billion was allocated to rail transport, including to a larger extent to cover operating expenses and personnel costs, and to a lesser extent to the modernisation and electrification of rail transport and the purchase of rolling stock. A further HUF 26 billion from the issues was used to finance the development of urban public transport (Budapest and Paks), and HUF 8 billion was earmarked for tax relief for environmentally friendly vehicles. In addition to Clean Transportation, the remainder of the funds collected from the issues were allocated to expenditure related to Land Use and Living Natural Resources (HUF 45 billion), Adaptation (HUF 19 billion), Energy Efficiency (HUF 23 billion), Waste and Water Management (HUF 5 billion) and Renewable Energy (HUF 3 billion). The proceeds from the green bonds avoided the emission of 1,813 kilotonnes of carbon dioxide equivalent greenhouse gases, which is equivalent to avoiding 2.0 kilotonnes of emissions for every billion forints of green bond proceeds (this indicator was 2.9 kilotonnes for 2021 emissions). Out of the total avoided carbon dioxide equivalent greenhouse gas emissions, 1,577 kilotonnes were related to rail transport, which on average represents 66.5 per cent of the emissions avoided due to rail transport. The main environmental impacts of the projects financed by green bonds issued under the 2020 Green Bond Framework between May 2020 and May 2023 are summarised in Table 2.

**Table 2: Main environmental impacts of the projects financed by green bonds issued between May 2020 and May 2023**

Indicator	Result achieved
Energy saved	1,492 Gwh
Avoided emission	3,480 ktCO <sub>2</sub> eq
Renewable energy production	58.2 GWh
Renewable capacity installed	5.1 MW
Upgraded railway lines	166.4 km
Electrified railway lines	149.6 km
Number of environmentally friendly public transport vehicles	209

Source: Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022

**Chart 3.18**  
Amount and distribution of proceeds from green bond issuance among green sectors, according to the time of issuance



\* Dividing the Allocated Amount to 2019 Eligible Green Expenditures to Green Sectors by using ratios

Source: Green Bond Allocation Report 2020; Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2021; Integrated Report on the Allocation and Environmental Impact of Hungary's Green Bond Proceeds, 2022; MNB

**The 2022 Integrated Report was externally reviewed by S&P Global Ratings.** The report is assessed as being in line with the 2020 Green Bond Framework and international standards<sup>62</sup>. S&P Global Ratings has acquired the “Shades of Green” business line, formerly part of CICERO, which was responsible for reviewing the reports of previous years. The methodology classifies each project into three rating categories<sup>63</sup>, but within the green sectors, projects can be given different ratings. As in the 2020 and 2021 assessments<sup>64</sup>, Clean Transportation projects, which accounted for the largest share, were mostly rated medium and dark green, but there were also some projects with a light green rating. According to the 2022 assessment, projects related to Adaptation and Renewable Energy were rated dark green. The 53 indicators in the impact assessment were considered relevant and sufficiently transparent. As an improvement compared to last year, the assessment highlights that the report also includes quantitative indicators for the Adaptation green sector and a more detailed qualitative analysis for several projects.

<sup>62</sup> S&P Global Ratings: External Review of Integrated Green Bond Report 2022

<sup>63</sup> The methodology classifies projects reviewed into three green rating categories based on their contribution to a low-carbon and climate-resilient future. Categories range from dark green to light green, with dark green being the strongest category.

<sup>64</sup> CICERO: External Review of 2020 Green Bond Allocation Reporting; CICERO: External Review of Integrated Green Bond Report 2021

### 3.2.3 Green mortgage bond issues

In recent years, green mortgage bonds have become an important instrument in the market for sustainable financial instruments. By issuing the securities, mortgage banks commit to hold at least as many green – i.e. energy-efficient – properties in the loan portfolio backing the mortgage bonds as the amount of funds raised at the time of issuance. As a result, mortgage bonds provide bondholders with higher quality collateral, which is also in line with social and economic policy requirements for environmental sustainability. The growing demand for the securities may encourage banks to favour green mortgages, which could lead to lower interest rates on loans through lower credit risk and more favourable pricing of the funds involved.



The MNB supported the creation of a domestic green mortgage bond market by way of targeted monetary policy instruments. The Green Mortgage Bond Purchase Programme was launched by the MNB in August 2021 to promote the development of

a domestic green mortgage bond market and to support the proliferation of mortgage lending practices that focus on energy efficiency. The tool is part of the MNB's Green Monetary Policy Toolkit, which was announced by the MNB following the decision of the Monetary Council on 6 July 2021. The [strategy paper](#) published is a framework for the

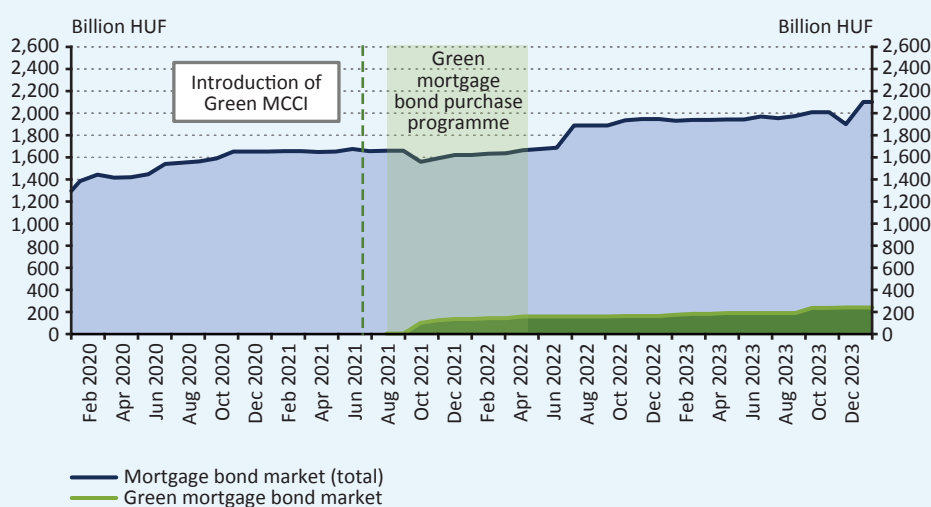
long-term operation of the MNB's monetary policy toolkit, detailing how environmental sustainability can be integrated into the MNB's set of monetary policy instruments. In parallel, the MNB applies the Mortgage Funding Adequacy Ratio (MFAR) as a supply-side incentive, which has taken into account green mortgage bonds and refinancing loans with a preferential weighting since 1 July 2021.

#### The share of green mortgage bonds in the domestic market continued to increase in 2023.

Following the launch of the Green Mortgage Bond Purchase Programme by the MNB, green mortgage bonds have started to play an increasing role in the domestic mortgage bond market. The share of green mortgage bonds continued to increase even after the MNB suspended its purchase programme, demonstrating that the MNB successfully kick-started the development of the market. The share of green mortgage bonds in the total domestic mortgage bond market increased over the past year, accounting for 11.3 per cent (HUF 237.8 billion) of the total market by the end of 2023, up from 8.4 per cent (HUF 162.3 billion) a year earlier. In terms of the ownership structure of mortgage bonds, the vast majority of securities are held by domestic institutions. The share of foreign ownership increased slightly in 2023, rising to more than 7.4 per cent at the end of the year, from 5.5 per cent at the end of December 2022 (Chart 3.19).

In 2023, five successful green mortgage bond issues were completed. In total, domestic mortgage banks raised more than HUF 50 billion at face value. All Hungarian mortgage

Chart 3.19  
Domestic mortgage bond portfolio (at face value)

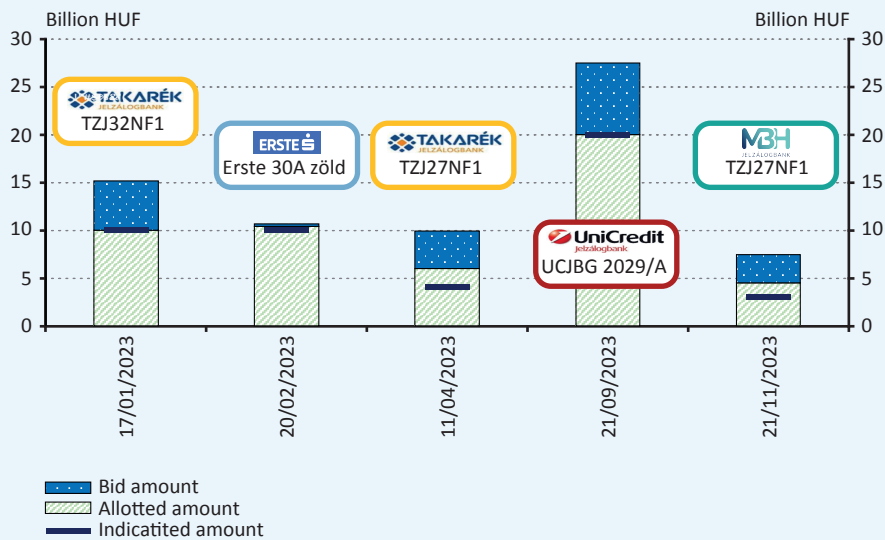


Source: MNB

banks except OTP and K&H issued green mortgage bonds in 2023. At the beginning of the year, Takarékbank (integrated into MBH Mortgage Bank during the year) raised HUF 10 billion in ten-year funds at an average yield of 8.91 per cent, followed by an additional HUF 6 billion in April at an average yield of 10.94 per cent for a ten-year term. Following the completion of the institutional integration, in October MBH Mortgage Bank raised additional funds of HUF 4.5 billion at face value at an average interest rate of 8.07 per cent in the framework of a tap issue. In February, Erste Mortgage Bank successfully completed the issuance of its second green mortgage bond with a face value of HUF 10.4 billion, a maturity of 2030 and an average yield of 9.66 per cent. In 2023, UniCredit Mortgage Bank issued the largest amount of green mortgage bonds, raising a total of HUF 20 billion at face value with a maturity in 2029 and an average yield of 7.65 per cent. At the same time, the mortgage bank auctioned a standard mortgage bond with the same parameters as the green issue. Bids for the latter bond were accepted by market participants in the primary market for HUF 23.2 billion at face value at an average yield of 7.81 per cent, which represents a green premium of 16 basis points for UniCredit’s green series in the primary market (Chart 3.20).

**The Transparency Reports provide quantitative data to show the positive impact of mortgages.** According to the transparency report published by the mortgage banks, refinancing green mortgages may have contributed to avoiding a total of 21.9 tonnes of carbon emissions. To quantify the positive environmental impacts, issuers typically first estimate the energy requirements of the properties behind the refinanced green mortgages. To do this, they can use their own available credit data or the minimum energy threshold set by the green bond standard. The calculated energy savings are based on the difference between the energy demand of the green property and the chosen reference portfolio, and then an attribution factor is applied to correct for the difference between the credit and the value of the property. Based on Hungarian practice, the reference portfolio can be the estimated value of the total loan portfolio refinanced by the mortgage bank or the average energy demand of the national housing stock. The 21.9 tonnes of carbon dioxide emissions avoided quantified in the Green Finance Report is the sum of the pro-rated values of the mortgage bond portfolio per HUF 1 billion of emissions avoided per bank and per nominal value, as reported in the Transparency Report of each mortgage bank.

**Chart 3.20**  
**Green mortgage bond issues in 2023**



Source: BSE

**Box 6****The Charter of Sustainable and Responsible Investment of the Magyar Nemzeti Bank**

**The Magyar Nemzeti Bank is committed to sustainability.** The MNB attaches great importance to using its available instruments to support the management of climate change challenges and to integrate environmental considerations in the broadest possible range of its activities without compromising its primary objective of achieving and maintaining price stability. To this end, in November 2023, the MNB published its [Charter of Sustainable and Responsible Investment](#), expressing its commitment to making reserve management more environmentally sustainable and setting medium- and long-term goals for greening reserve management without compromising its traditional objectives. Besides being a compass for foreign exchange reserves investment strategy in integrating green considerations, the document may serve as a model for financial market participants to follow and contribute to the development of the market.

**In the Charter, the MNB structures the greening of reserve management and the necessary steps to achieve it along four pillars.** These are (1) measurement, (2) investment strategy, (3) transparency, active engagement and (4) monitoring. The MNB monitors the relevant environmental sustainability factors and criteria, and integrates them into the investment process where possible, keeping in mind the triple bottom line (liquidity-security-return) of reserves management. The Charter's commitments include an expected improvement in data quality and availability, a more comprehensive analysis of the climate impact of the reserve's investments, and an active role for the central bank in promoting market development. In the long term, the aim is to decarbonise the reserve portfolios as much as possible, while taking account of the primary reserve targets and requirements.

**The method of implementing specific elements of the Charter largely depends on future developments in data quality and availability.** Accordingly, the MNB closely monitors the development of sustainable and responsible investment practices and the emergence of new practices and considers their adoption in its own operations. It also regularly reviews the commitments and objectives set out in the Charter and, if necessary, supplements and modifies them in the light of the changing market environment.

**As a first step towards fulfilling the commitments made in the Charter, the MNB has expanded the size of its green bond portfolio.** At the end of 2023, the Monetary Council decided to double the size of the dedicated green bond portfolio to EUR 500 million, which forms part of the central bank's foreign reserves. With this decision, the MNB promotes environmental sustainability further, in line with international best practices and the central bank's green mandate. Increasing the green bond portfolio will have a real, short-term positive environmental impact.

### 3.2.4 Stock market, stock exchange

**The green nature of equities is often harder to define compared to other financial products.** In the case of a green bonds, the purpose of the fund raising is defined, whereas in the case of a share it is more difficult to define; the link is not direct. A company can have many different activities and accordingly, shareholders' equity can be linked to many different purposes. Most often, shares in companies operating in green industries (e.g. "cleantech") or issuers included in some kind of sustainability stock index are considered green shares. However, it is important to underline that there is currently no universally accepted definition of green.

**The Budapest Stock Exchange is committed to promoting sustainable goals.** The Budapest Stock Exchange has been a member of the international Sustainable Stock Exchanges (SSE) initiative since 2019. Sustainable Stock Exchanges has more than 130 members worldwide, including the world's largest stock exchanges such as the New York Stock Exchange and the London Stock Exchange Group.<sup>65</sup>

**In 2023, the BSE launched its ESG consulting pilot programme.** In 2023, the Budapest Stock Exchange and EY launched an ESG consulting pilot programme based on a rating methodology developed jointly by EY and the Budapest Stock Exchange, which aims to support the Hungarian mid-cap sector on the path to sustainability. 39

<sup>65</sup> <https://sseinitiative.org/members/>

medium-sized companies applied successfully: in addition to working with an ESG consultant selected from the BSE-accredited consultancy network, the companies also received EU funding under the Economic Development and Innovation Operational Programme (GINOP) and funding aimed at the Central Hungary Region amounting to a total of almost HUF 475 million to cover the costs of the consulting pilot programme.<sup>66</sup> The scores and responses to the 30 indicators defined by the rating methodology were uploaded by the companies to an online pilot database developed by Opten, where aggregate statistics calculated on the basis of the indicators were also available.

**The Budapest Stock Exchange also presented its first Sustainability Report.** As the latest milestone in its sustainability efforts, the Budapest Stock Exchange presented its first Sustainability Report for the year 2022 in May 2023. The Budapest Stock Exchange pays special attention to the importance of sustainability, and the Sustainability Report is an important platform for this, which, in addition to reporting on the sustainability activities of the BSE, also details its sustainability strategy for the period of 2023–2025.<sup>67</sup>

**BSE has set up a new platform for green products.** The BSE aims to facilitate the matching of issuers of securities that implement sustainable green investments and investors interested in green securities by ensuring that if the debt security (bond, mortgage bond and government bond) to be listed/registered complies with one of the international Green Bond Framework Schemes listed in the Green Bond Issuance Guide of the Magyar Nemzeti Bank<sup>68</sup>, the BSE will allow the issuer to display a green distinctive mark on the BSE website. There are also a number of convenience features to help you find green products. By filtering by product category, you can obtain a list of the green products listed on the BSE and their main parameters. In addition, green securities admitted to/registered on the BSE are also directly visible on the green virtual platform, regardless of the trading venue. Finally, a green leaf icon has been added to differentiate green securities and the documentation related to green securities has been highlighted in the documents published by the issuer.<sup>69</sup>

### 3.2.5 Venture capital funds and private equity funds

**A sustainability focus can also be observed in venture capital funds and private equity funds.** In Hungary, two members of the state-owned MFB Group, MFB Invest and Hiventures, are among the most important equity investors and equity fund managers. Sustainability is managed at Group level: the Group has a sustainability strategy and an externally certified sustainability framework. According to the latest MFB Sustainability Report available at the time of writing this report, MFB Invest's portfolio includes renewable energy projects (1 individual investment and 1 investment fund, 1 bond) and 3 other funds that finance investments for water management development, environmental protection and/or positive social impact. Since its launch in 2017, Hiventures has made a total of 36 energy, environmental and sustainability investments worth HUF 8.71 billion.<sup>70</sup> However, it is not only state-backed companies that are making progress; for example, Valor Capital Venture Capital Fund's Green Fund invests primarily in companies that are active in renewable energy or have other projects with a positive environmental impact.<sup>71</sup>

### 3.2.6 Investment funds

**Despite rising inflation and geopolitical conflicts, green investments have not lost their significance.** The Green Finance Report 2022 reported that the Sustainable Finance Disclosure Regulation (SFDR)<sup>72</sup> has provided a solution to the problem of identifying and classifying investment funds with environmental objectives. In this way, European investment funds can be understood as a reminder of three broad (but not strict) frameworks:

- I. traditional investment funds that do not have a sustainability objective
- II. ESG investment funds aiming to promote environmental and social characteristics ("light green")
- III. sustainable investment funds that contribute to a social or environmental objective ("dark green").

<sup>66</sup> <https://www.bet.hu/site/Magyar/tartalmak/Rolunk/Sajtoszoba/Sajtokozlomenyek/27-hazai-kozepvallalattal-vette-kezdetet-a-budapesti-er-tektozsde-esg-pilot-tanacsadasi-programja>

<sup>67</sup> [Budapest Stock Exchange presents its first Sustainability Report](#)

<sup>68</sup> [Green Bond Issuance Guide](#)

<sup>69</sup> [BSE information document](#)

<sup>70</sup> [MFB Sustainability Report 2022.](#)

<sup>71</sup> [Valor capital](#)

<sup>72</sup> [Regulation \(EU\) 2019/2088 of the European Parliament and of the Council of 27 November 2019](#)

**Chart 3.21**  
**Growth of domestic ESG and sustainable investment funds by net asset value**



Source: MNB

The previous year has seen a slowdown in the growth of ESG funds in the EU. Moreover, for investments with a sustainable objective, we could see capital outflows for the first time at the end of 2023. Although the value of sustainable assets under management continued to grow throughout the year – and eventually reached EUR 5,200 billion –, by the end of the year a number of factors restrained growth. In 2023 Q4, sustainable investments saw outflows of EUR 4.7 billion which, according to a Morningstar report<sup>73</sup>, was the first such negative trend for these financial products since the SFDR regulation became applicable. According to the report, a number of factors have contributed to the decline in investor appetite, including the macro environment, high interest rates, inflation, fears of recession in some of the world’s major economies, and geopolitical risks. It is also reasonable to assume that some investors have become more cautious in their approach to sustainable financial products due to concerns about greenwashing and the ever-changing regulatory environment. Last but not least, the wave of downgrades at the end of 2022, which was also highlighted in the 2023 Green Financial Report, and other issues related to the implementation of the SFDR’s detailed rules have also caused confusion among market participants.

In contrast, Hungary has seen an increase in the amount of capital flowing into ESG funds this year. By the end of 2023, assets under management on an ESG basis exceeded HUF 328 billion, which translates to an increase of almost 80 per

cent compared to the previous year<sup>74</sup> (Chart 3.21). However, the growth achieved does not show a clear correlation with the number of investment funds, with 35 investment funds operating in total, unchanged from the same period last year. In addition, there is still only one investment fund in Hungary that focuses purely on sustainable investments, the K&H eco-responsible investment fund, whose assets have decreased slightly compared to 2022 Q4, with a value of approximately HUF 7.5 billion. Overall, however, the share of green investment funds represents only 2.06 per cent of the total domestic market in terms of net asset value, which is an improvement compared to the same period last year, although still not significant. The increase was mainly driven by two factors: on the one hand, a number of investment funds have added new series, which, in terms of value, have indeed increased investor appetite for domestic ESG funds. At the same time, with the amendment of the MNB’s reporting decree<sup>75</sup> on 1 January 2024, the MNB made the reporting of ESG and sustainable investment funds to the central bank mandatory, thus replacing the previous “manual” collection, the MNB has reorganised and adjusted its databases.

In 2023, the quality of sustainability information on investment funds has also improved considerably. The second level of the SFDR regulation<sup>76</sup> became applicable at the beginning of 2023, bringing uniformity to the disclosure of investment funds with an environmental or social objective. Sustainability information for the funds is available

<sup>73</sup> SFDR Article 8 and Article 9 Funds: Q4 2023 in Review, Morningstar, 2024.

<sup>74</sup> Green finance in Hungary, Magyar Nemzeti Bank, 2024.

<sup>75</sup> MNB Decree No. 58/2023 (XI. 24.) on the data reporting obligations of capital market organisations to the central bank’s information system, primarily for the purpose of facilitating the fulfilment of the Magyar Nemzeti Bank’s supervisory duties

<sup>76</sup> Commission Delegated Regulation (EU) 2022/1288 (of 6 April 2022) supplementing Regulation (EU) No 2019/2088 of the European Parliament and of the Council with regard to regulatory technical standards specifying the content and presentation of information on the principle of no significant harm, the content, methodology and presentation of information on sustainability indicators and adverse impacts on sustainability, and the content and presentation of information on environmental and social characteristics and the promotion of sustainable investment objectives in pre-contractual documents, websites and periodic reports

in the annexes to the Prospectus in a transparent and uniform template. The regulation enabled investors to obtain more specific information on the green commitment of investment funds, including the minimum proportion to which a Green/ ESG fund indirectly promotes environmental or social objectives, whether and to what extent it has sustainable investments and whether it meets the strict criteria of the Taxonomy Regulation. In addition to asset allocation, investors can get more systematic and in-depth information on the sustainability strategies of investment funds, as well as information on the sustainability indicators used to measure the attainment of the sustainability goals promoted by the fund. In other words, if an ESG fund wants to contribute to climate change mitigation, the regulation requires the fund manager to measure and report the GHG intensity of the fund on an annual basis, for example. Experience shows that most financial products with a sustainable character have committed to measuring carbon footprints and GHG emissions, but there are also examples of the fund measuring unadjusted gender pay gaps between issuers, or the proportion of activities that adversely affect biodiversity-sensitive areas. This quantitative information must be presented in the annual report, which allows for comparability between plans and the results. For the first time, investment fund managers had to report their 2022



results in 2023. In this context, in spring 2023 the Magyar Nemzeti Bank launched the [Green Financial Product Platform](#) in order to facilitate, among other things, information provision to investors. Relying on the Product Finder, they can compare and learn about more green investment funds

along the lines of the above-mentioned sustainability information and financial information.

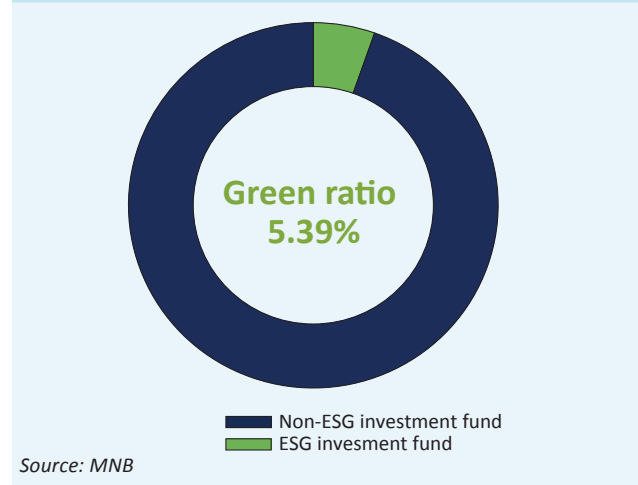
### 3.2.7 Unit-linked insurance and fund portfolios

**The year 2023 did not favour green insurance asset funds.** The number and asset value of sustainable asset funds available for unit-linked life insurance has also declined over the past year. However, this is not solely due to asset outflows, but rather to a re-categorisation due to tighter regulation. As with investment funds (section 3.2.6), the SFDR classification is applied to insurance funds, i.e. a distinction is made between light green, dark green and traditional funds. Due to the tightening of the regulation, insurers have reclassified several asset funds to a lower

sustainability category, which is why, while at the end of 2022 customers could choose from 10 dark green asset funds, by the end of 2023 this number was reduced to 2.

**Not only in terms of their numbers, but also in terms of their net asset value, their market share has declined.** In terms of number of assets, the share of light green and dark green asset funds in terms of number of units was 7.88 per cent at the end of 2023, compared to 9.53 per cent in the same period of 2022. The situation also deteriorated in terms of net asset value, with ESG asset funds declining on the one hand and traditional asset funds gaining on the other, the share of ESG asset funds fell from 8.79 per cent to 5.39 per cent in one year (Chart 3.22). It is worth adding once again that the contraction in asset value is mainly due to the reclassification of portfolios previously considered sustainable as conventional (non-sustainable). Without the reclassified asset funds, the share of sustainable asset funds would have been only 4.33 per cent in 2022 and accordingly, their market share would have increased in 2023.

**Chart 3.22**  
Share of domestic green asset funds by net asset value in 2023



**The market for pension funds is unchanged in 2023.** Only the Aranykor Voluntary Pension Fund<sup>77</sup> continues to offer a portfolio that takes into account environmental, social and corporate governance aspects (ESG Dynamic Portfolio), with a net asset value of nearly HUF 8.6 billion. Compared to last year, this represents an increase of more than HUF 1 billion, however, given that the overall market has expanded at a slow pace, their share of the total market was 0.38 per cent in 2023, which is a slight decrease compared to 0.4 per cent in 2022.

<sup>77</sup> Portfolio offer



**Box 7****Greenwashing: the shady side of misleading**

**There are many investments on today's international and domestic capital markets that contribute to sustainability to varying degrees.** However, sometimes it is not easy to recognise and assess how much, if at all, a scheme actually contributes to climate protection, for example. *Greenwashing* is not a new phenomenon; it occurs in numerous sectors (e.g. food, cosmetics) when the environmental benefits of a product or service are overstated or a green image is created without any substantiation or action.

**The phenomenon has also recently appeared in financial markets.** European Supervisory Authorities understand it to be a set of practices where sustainability-related disclosures and statements do not clearly and fairly reflect the underlying sustainability profile of the financial institution or its investments, thereby misleading investors or customers.<sup>78</sup> The biggest problem, apart from the fact that greenwashing activities can mislead consumers, is that they also undermine trust in truly green financial products.

**The actual occurrence of a greenwashing risk may also have a negative impact on financial market participants.** It can deter investors, thereby reducing demand for the organisation's financial assets, which can affect the liquidity of those assets. The DWS scandal that unfolded in 2022 underlines these points specifically. As you know, according to its 2020 annual report the listed company (Deutsche Bank's fund manager) had more than EUR 900 billion under management with ESG considerations. In the year following the entry into force of the SFDR Regulation<sup>79</sup>, which was designed to increase transparency as mentioned already in Section 3.2.6, the fund manager reported only EUR 115 billion as ESG assets, which, in addition to sales, may have reflected the fact that it had sold significantly more financial products as "greener" and "more sustainable" previously than would have been justified. Following the announcement, investors immediately priced in the risk associated with the adverse development. The share price of DWS fell by around 13 per cent in one day. To indicate the magnitude of this event, it was the largest stock price movement (excluding the impact of the COVID-19 outbreak) since the company went public<sup>80</sup>.

**Cases such as the above highlight the many challenges in the rapidly evolving ESG market.** The still partly immature regulation, the lack of a labelling system and the limited availability of data combined with the resulting lack of information may lead to similar greenwashing activity. However, there is also a lack of adequate resources on the part of the supervisory authorities to examine the issue comprehensively. It is worth noting that the risk of greenwashing is still low in Hungary due to the low share of green financial products in the domestic market and the novelty of green finance. On the other hand, the MNB has issued guidelines in this area (e.g. by conducting preliminary professional consultations, publishing a Q&A document) and its supervisory activities also play an important role (e.g. in the authorisation of investment funds, by integrating the requirements of the SFDR into supervisory processes and comprehensive reviews).

**The European Securities and Markets Authority's (ESMA) strategic pillars on sustainable finance respond to these challenges.** These are: (1) combating greenwashing and promoting transparency, (2) building the capacity of national supervisors and ESMA in the area of sustainable finance, and finally (3) monitoring, assessing and analysing ESG markets and risks<sup>81</sup>. In line with these priorities, the fine-tuning of the related legislation is well underway<sup>82</sup> for example in the area of disclosures, and the regulation (CSRD) and standards (ESRS) for access to raw data have entered into force<sup>83</sup>. Future developments include the EU regulation on the transparency of the ESG valuation

<sup>78</sup> [Progress Report on Greenwashing, ESMA, 2023.](#)

<sup>79</sup> Regulation (EU) 2019/2088 of the European Parliament and of the Council.

<sup>80</sup> [DWS chief resigns after police raid over greenwashing claims, Financial Times, 2022.](#)

<sup>81</sup> [Priorities - Sustainable Finance Roadmap 2022 – 2024, ESMA, 2022](#)

<sup>82</sup> [Financial Markets: Commission consults on sustainable finance disclosures, European Commission, 2023.](#)

<sup>83</sup> [The Commission adopts the European Sustainability Reporting Standards, European Commission, 2023.](#)

methodology<sup>84</sup>, and EU guidelines on the naming of investment funds<sup>85</sup>. In the domestic context, the so-called Sustainability Report was also produced as an implementation of the CSRD. These laws, regulations, guidelines and reporting standards are all designed to minimise the risk of greenwashing and hence, to increase transparency and reliability in the financial sector.

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<sup>84</sup> Sustainable finance – environmental, social and governance ratings and sustainability risks in credit ratings, European Commission, 2024.

<sup>85</sup> ESMA proposes changes and updates timeline for its Guidelines on funds' names, ESMA, 2023.

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## 4 National and international regulation and expected changes

*The changes and innovations in green finance require developments in many areas, and regulation is no exception. Over the past year, a number of revisions and amendments have been made by international organisations and the Magyar Nemzeti Bank to make the current regulation more precise, transparent and easier to understand. But it was not only the amendments to the existing regulations that were being made, in areas that had not been regulated before, such as ESG, the emerging regulation was gaining a foothold. However, these reforms are now not only focused on banks, but are also increasingly extending to insurers, thus increasing the transparency and institutional coverage of green finance.*

*The Hungarian central bank's goal remains to support the green turn and promote the sustainability transition. Regulation is the most powerful tool for this. Through regulations and recommendations, it provides a framework for green finance, facilitating the work of institutions, while at the same time providing information or encouraging the provision of information, protecting and educating customers. Magyar Nemzeti Bank is at the service of green finance, customers and financial institutions through publications, recommendations, consultations and a Green Financial Product Finder.*

### 4.1 DEVELOPMENTS IN INTERNATIONAL ORGANISATIONS

**In recent years, the European Central Bank (ECB) has taken a leading role in greening the financial system of the EU.** To deepen climate action, the ECB has adopted a new Climate Action Plan for the period 2024–2025, which, by broadening the 2022 climate strategy, focuses on three main areas: 1) mobilising the finance needed for the green transition, 2) identifying and addressing the physical risks from climate change and 3) examining the financial risks from environmental degradation and hence, biodiversity loss.<sup>86</sup>

**However, good quality data is essential to fully understand growing climate risks.** To address this, the ECB published a new set of statistical indicators on climate change in 2023.<sup>87</sup> The indicators are a first step to mitigate the wide data gap surrounding climate change, providing information on the impact of physical risks (e.g. flooding, forest fires, extreme storms) on financial assets and carbon emissions financed by banks, among other things.<sup>88</sup>

**In addition, the ECB continued to publish climate stress tests for economy as a whole.** The second stress test published last year examined the resilience of households, companies and banks to climate risks under three scenarios (accelerated, late-push and delayed transition).<sup>89</sup> The results show that households and businesses clearly benefit from a faster transition, as delays lead to higher credit risks and costs.<sup>90</sup>

**Alongside the ECB, the Network for Greening the Financial System (NGFS) is one of the key institutions in the international climate protection movement.** Founded in 2017, the NGFS, which brings together central banks and financial regulators, currently has 134 members and 21 observers.<sup>91</sup> The primary objective of the network is to create an international knowledge hub that will support the greening of the financial system through the sharing of expertise and best practices to fight climate change globally.

**In line with this mandate, the NGFS has contributed to the fight against climate change over the past year, mainly through publications.** It published long-term macro-

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<sup>86</sup> [Climate and nature plan 2024-2025](#)

<sup>87</sup> [ECB publishes new climate-related statistical indicators to narrow climate data gap](#)

<sup>88</sup> [Towards climate-related statistical indicators](#)

<sup>89</sup> [The Road to Paris: stress testing the transition towards a net-zero](#)

<sup>90</sup> [Faster green transition would benefit firms, households and banks, ECB economy-wide climate stress test finds](#)

<sup>91</sup> [Membership](#)

financial and short-term climate scenarios to address financial risks from climate change, as well as technical papers on the use of blended finance for environmental purposes.<sup>92 93 94 95</sup>

**In addition to the publications, the network announced a new initiative at its event on 7 September 2023.** The objective is to establish a scientifically sound framework for managing financial risks. It aims to facilitate the work of both central banks and supervisory authorities in the field of climate adaptation by providing common international definitions and recommendations.<sup>96</sup>

**In 2023, the Financial Stability Board (FSB) continued to play a key role in examining the impact of climate risks on financial stability.** In July 2023, the FSB published the 2023 status report of the FSB Roadmap for Addressing Financial Risks from Climate Change 2021.<sup>97</sup> The document highlights that progress has been made in all four focus areas compared to last year, namely: (1) climate risk reporting; 2) data; 3) climate vulnerability analysis; 4) regulatory and monitoring issues. In the area of disclosures, the status report highlights the publication by the International Sustainability Standards Board (ISSB) of its first two reporting standards, IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures to promote sustainable decision making). The FSB also pointed out in its status report that work to improve data quality and data accessibility continued over the past year, and that institutions such as the NGFS and the OECD, as well as the FSB itself, supported efforts to analyse climate vulnerabilities and improve regulatory issues.<sup>98</sup>

**The FSB's Task Force on Climate-related Financial Disclosures (TCFD) issued its latest report in October**

**2023.** According to the report, the proportion of companies disclosing information on climate change and climate risks has steadily increased. In the financial year of 2022, 58 per cent of companies disclosed their climate risks along at least five of the eleven recommendations, while only 4 per cent of companies took all recommendations into account.<sup>99</sup> However, the status report also showed that Europe and the Asia-Pacific region are more willing to publish climate-related metrics than North America. While 78 per cent of companies in Europe and 49 per cent of companies in the Asia-Pacific region disclose climate risk metrics and data, the corresponding figure was only 35 per cent in North America.<sup>100</sup>

**During 2023, the International Monetary Fund (IMF) strengthened its commitment to global climate action further through three key actions.** On the one hand, the Resilience and Sustainability Trust (RST), a financial fund to support climate adaptation in low-income countries announced in October 2022, was piloted by the IMF in five developing countries (Costa Rica, Barbados, Rwanda, Bangladesh and Jamaica), while experts believe that 44 more countries would need similar international financial support. More and more developed countries are announcing their contributions to the fund to increase its financing.<sup>101</sup>

**To strengthen climate cooperation, the IMF and the World Bank signed a joint declaration in September 2023.** A new Climate Advisory Group has been set up to meet every two months to review developments in the organisations' climate commitments, both globally and at country level.<sup>102</sup> The IMF's key annual reports (Global Financial Stability Report, Fiscal Monitor) focus on the climate finance needed for the transition to a carbon neutral economy and the implications of climate change for fiscal policy and public finances.<sup>103, 104</sup>

<sup>92</sup> NGFS publishes latest long-term climate macro-financial scenarios for climate risks assessment

<sup>93</sup> NGFS publishes a conceptual note on short-term climate scenarios

<sup>94</sup> NGFS publishes Conceptual Note for the Blended Finance Handbook

<sup>95</sup> NGFS publishes a document on Scaling up Blended Finance in EMDEs

<sup>96</sup> The NGFS organises a launch event in Paris for the release of its Conceptual Framework for nature-related financial risks

<sup>97</sup> FSB Roadmap for Addressing Financial Risks from Climate Change: 2023 Progress Report - Financial Stability Board

<sup>98</sup> FSB Roadmap for Addressing Financial Risks from Climate Change Progress report: 2023 progress report

<sup>99</sup> 2023 TCFD Status Report: Task Force on Climate-related Financial Disclosures - Financial Stability Board (fsb.org)

<sup>100</sup> P121023-2.pdf (fsb.org)

<sup>101</sup> Resilience and Sustainability Trust

<sup>102</sup> Joint Statement of the IMF Managing Director and of the World Bank President

<sup>103</sup> Global Financial Stability Report 2023

<sup>104</sup> Fiscal Monitor / Climate Crossroads: Fiscal Policies in a Warming World 2023

**In 2023, the Organisation for Economic Co-operation and Development (OECD) continued to publish numerous papers in the topic of sustainability.** The OECD published studies and technical papers on topics such as metrics for net-zero targets; decarbonisation of the industrial sector; the cost of green hydrogen; and government responses to climate change.<sup>105</sup> The OECD published one of its key publications for monitoring net zero emissions in 2023 as well, The Climate Action Monitor 2023. The publication covers greenhouse gas emissions, climate change risks and climate change trends in OECD members and partner countries. The publication concludes that without an increase in national climate programmes, countries will not be able to achieve net zero emissions.<sup>106</sup>

**The Finance Initiative of the UN Environment Programme (UNEP FI)<sup>107</sup> continued to contribute actively to the promotion of sustainable finance in 2023.** The significance of the organisation and the importance of sustainability are reflected in the fact that UNEP FI reached another milestone last year: its membership grew to more than 500 by 2023. It is noteworthy that since its creation in 2019, by 2023 the UN Principles for Responsible Banking (PRB) had been signed by 325 banks from 80 countries compared to the initial 130, representing approximately 50 per cent of

the world's banking assets or USD 90 trillion. Nature also became an increasing focus for the financial sector last year: the Taskforce on Nature-related Financial Disclosures (TNFD), of which the UNEP FI is a founding member, saw an increase in the number of participants and more than 50 financial institutions from 25 countries participated in the development of the framework, with technical assistance from the UNEP FI.

**Progress has also been made on the regulation and policy needed to achieve net zero in 2023.** The COP28 climate conference culminated in the launch of a new working group. The purpose of the UN Task Force on Net Zero Policy is to assist in the proper design and monitoring of policies needed for emission-related commitments.

**The UNEP FI has also been actively involved in the development of taxonomy systems for sustainable finance.** As a result, a framework for sustainable finance taxonomies has been developed, mainly targeting Latin America and the Caribbean (Common Framework for Sustainable Finance Taxonomies for Latin America and the Caribbean). It has also provided technical assistance for the establishment of sustainable taxonomic systems in Brazil, Panama and Costa Rica.

**Box 8**

**Sustainability measures of the Banque de France's (BdF)**

**The Banque de France (BdF) is a pioneer among central banks in the combat against climate change, with one of the most comprehensive climate strategies in the world.** The BdF's sustainability initiatives are based on four pillars: 1) adapting monetary policy operations to climate risks, 2) greening the financial system through active central bank management, 3) taking climate change into account in the services provided by the central bank and 4) promoting financial stability through scenario analysis, stress testing and monitoring the climate exposures of financial institutions. To ensure that all these climate objectives are met, the BdF established a Climate Change Centre in 2021, which closely monitors and coordinates all of the Bank's climate change initiatives.

<sup>105</sup> OECD Climate Change - Resources

<sup>106</sup> The Climate Action Monitor 2023 : Providing Information to Monitor Progress Towards Net-Zero | The Climate Action Monitor | OECD iLibrary (oecd-ilibrary.org)

<sup>107</sup> <https://www.unepfi.org/industries/banking/2023-in-review-a-growing-membership-continues-ambitious-action-on-sustainable-finance/>

**The BdF is also a role model for central bank portfolio management.** In line with its commitment under Pillar 1, it has the most advanced sustainable investment strategy among the G20 countries, which almost completely excludes fossil fuel investments from the central bank portfolio. While from 2021 all companies with more than 10 per cent of their turnover coming from oil, shale gas, oil sands and Arctic and deep-sea exploration for the extraction of these fossil fuels will be excluded from the portfolio, and by the end of 2024 a total ban on investment will come into force for companies engaged in coal-related activities and new fossil-based energy projects. With these exclusions, the BdF's primary objective is to ensure that its investments meet the global climate target of achieving a maximum temperature increase of 1.5 degrees Celsius above pre-industrial levels, as set out in the Paris Agreement.

**The BdF also places particular emphasis on supporting markets offering green financial products.** To date, it has invested almost EUR 2 billion in green bonds and sustainability funds, and has purchased EUR 160 million in sustainability and social bonds: the former to finance projects with environmental objectives, the latter to finance projects with social objectives. In addition, in 2022, the BdF became the first central bank in the world to join the Carbon Disclosure Project (CDP), the largest environmental disclosure scheme in the world, which contributes significantly to the French central bank's sustainability investment decisions by providing an extensive database of companies' environmental activities.

**However, greening the BdF's own activities is not in itself sufficient for the transition to a carbon neutral economy.** It also requires the contribution of the whole financial system. Recognising this, the BdF continuously monitors the climate risks to the functioning of the financial system, in particular, the financial risks arising from disorderly and late transition. In addition, the BdF plays a key role in international climate cooperation: not only did it contribute significantly to the launch of the NGFS climate network, as presented earlier, but it also chairs its permanent secretariat. Together with the network, the French central bank announced a unique initiative in 2023 to set up a framework to guide central banks and supervisors in managing climate change risks.

**Table 3**  
**Examples of the main sustainability-related measures of central banks from 2023 based on criteria determined<sup>108</sup>**

Central bank	Macro- and micro-prudential system	Sustainability components in the central bank portfolio	Conference	Stress tests <sup>109</sup>	Publication	Establishing an organisational unit / working group	Disclosure/TCFD	ESG
Austria			<a href="#">Climate conference</a>	Yes	<a href="#">Climate exposure of the Austrian banking system</a>	<a href="#">Group of experts</a>	<a href="#">TCFD report</a>	<a href="#">ESG considerations in the portfolio</a>
Belgium	<a href="#">Recommendation on energy efficiency</a>	<a href="#">Sustainable investment charter</a>	<a href="#">Climate conference</a>	Yes	<a href="#">Managing climate risks</a>	<a href="#">Climate risk hub</a>	<a href="#">TCFD report</a>	<a href="#">ESG considerations in the portfolio</a>
Brazil	<a href="#">Modification of credit conditions</a>	<a href="#">Sustainability considerations in the portfolio</a>	<a href="#">Annual conference</a>	Yes	<a href="#">Environmental and climate risks</a>		<a href="#">Quantitative reporting by banks</a>	<a href="#">Disclosure and publication</a>
China	<a href="#">Refinancing Programme CERF</a>	<a href="#">Green Bond Project Catalogue</a>	<a href="#">Budapest Renminbi Initiative Conference</a>	Yes		<a href="#">Joint Green Finance Task Force with Singapore</a>	<a href="#">Climate risk disclosure</a>	<a href="#">ESG recommendation (CBIRC)</a>
Croatia	<a href="#">Climate strategy</a>		<a href="#">Climate risk management workshop</a>		<a href="#">Effects of extreme weather on the Croatian economy</a>			<a href="#">Joining the NGFS</a>
Denmark	<a href="#">Climate exposure management in the banking sector</a>	<a href="#">Disclosure of the carbon footprint of the foreign exchange reserve</a>	<a href="#">Climate conference</a>		<a href="#">Institutional investors' carbon footprint</a>			
ECB	<a href="#">Managing climate risks</a>	<a href="#">Disclosures related to portfolios</a>	<a href="#">Climate conference; Energy transition conference</a>	Yes	<a href="#">Climate strategy;</a>	<a href="#">ECB Climate Change Centre</a>		
England	<a href="#">Managing climate risks</a>	<a href="#">Greening the corporate bond purchase scheme</a>	<a href="#">Climate conference</a>	Yes	<a href="#">Climate strategy Annual Report</a>		<a href="#">TCFD report</a>	
Estonia		<a href="#">Sustainability principles</a>			<a href="#">Competitiveness Report;</a>	<a href="#">Climate Change Coordination Hub</a>	<a href="#">TCFD report</a>	<a href="#">Counselling</a>
France	<a href="#">Assessment of risks to the French financial system</a>	<a href="#">Responsible investment report</a>	<a href="#">Climate change conferences</a>		<a href="#">The transition to carbon neutrality: effects on price stability</a>	<a href="#">Climate Change Centre</a>	<a href="#">Joining the CDP</a>	
Greece			<a href="#">Climate change conference</a>		<a href="#">Climate Exposure Report</a>	<a href="#">Centre for Sustainability</a>		

<sup>108</sup> The list is not exhaustive, MNB has listed some key measures. Compared to last year's Green Finance Report, the new content elements are shown in italics.

<sup>109</sup> Reported stress tests are also included in the list.

Table 3

Examples of the main sustainability-related measures of central banks from 2023 based on criteria determined<sup>108</sup>

Central bank	Macro- and micro-prudential system	Sustainability components in the central bank portfolio	Conference	Stress tests <sup>109</sup>	Publication	Establishing an organisational unit / working group	Disclosure/ TCFD	ESG
Hungary	<a href="#">Green recommendation for the insurance sector</a>	<a href="#">Green bond portfolio</a>	<a href="#">Green Finance Conference</a>	<a href="#">Yes</a>	<a href="#">Green Finance Report</a>	<a href="#">Directorate for Sustainable Finance<sup>110</sup></a>	<a href="#">TCFD report</a>	<a href="#">Green Finance Product Finder</a>
Ireland	<a href="#">Consultation</a>	<a href="#">Associated with the BIS Green Bond Investment Fund</a>	<a href="#">Climate Risk Forum</a>		<a href="#">Mortgage lending;</a>	<a href="#">Organisational unit</a>	<a href="#">Disclosure:</a>	<a href="#">Circular</a>
Italy		<a href="#">Sustainable investments</a>	<a href="#">ESG conference</a>		<a href="#">Annual Report</a>	<a href="#">Climate Change Hub and Climate Committee</a>	<a href="#">TCFD report</a>	<a href="#">Investigating regulation</a>
Japan	<a href="#">Special rules for climate finance</a>	<a href="#">Climate transition bonds</a>		<a href="#">Yes</a>	<a href="#">Climate risk scenario analysis</a>	<a href="#">Climate Change Coordination Hub</a>	<a href="#">TCFD report</a>	<a href="#">Questionnaire</a>
Korea		<a href="#">Negative screening system</a>	<a href="#">International Conference on Green Finance</a>		<a href="#">Climate change impacts on the domestic economy in Korea</a>	<a href="#">Climate Change Response Task Force</a>		<a href="#">ESG focus in the portfolio</a>
Latvia	<a href="#">Roadmap for a sustainable financial sector</a>	<a href="#">Sustainability strategy</a>	<a href="#">Sustainability and money</a>	<a href="#">Yes</a>	<a href="#">Report on Financial Stability</a>		<a href="#">TCFD report</a>	
Lithuania	<a href="#">Green Strategy 2023–2025</a>	<a href="#">Responsible investment principles</a>	<a href="#">Green conference</a>		<a href="#">Financial risk assessment</a>	<a href="#">Climate Change Centre</a>	<a href="#">CO<sub>2</sub> footprint report</a>	
Luxemburg		<a href="#">Sustainable corporate strategy</a>			<a href="#">Long-term sustainability</a>	<a href="#">Green Commission</a>	<a href="#">TCFD report</a>	
Malaysia	<a href="#">Climate data catalogue</a>	<a href="#">Portfolio quarantine</a>	<a href="#">Climate change conference</a>	<a href="#">Yes</a>	<a href="#">Climate risk analysis</a>	<a href="#">Joint Committee on Climate Change (JC3)</a>	<a href="#">TCFD application guide</a>	<a href="#">Information website</a>
Mexico			<a href="#">CEMLA-UNEP FI climate change conference</a>	<a href="#">Yes</a>	<a href="#">Climate and environmental risks and opportunities</a>	<a href="#">Organisational unit within the central bank</a>	<a href="#">TCFD Consortium</a>	
Netherlands	<a href="#">Guide to managing climate and environmental risks</a>	<a href="#">Sustainability goals in portfolio management</a>	<a href="#">Biodiversity Conference</a>		<a href="#">Dutch green bond market;</a>	<a href="#">Sustainable Finance Office</a>	<a href="#">Harmonisation of disclosure</a>	

<sup>110</sup> Executive Director for Sustainable Finance, Digital Oversight and Supervisory Coordination



**Table 3**  
**Examples of the main sustainability-related measures of central banks from 2023 based on criteria determined<sup>108</sup>**

Central bank	Macro- and micro-prudential system	Sustainability components in the central bank portfolio	Conference	Stress tests <sup>109</sup>	Publication	Establishing an organisational unit / working group	Disclosure/ TCFD	ESG
Russia	<i>Sustainability recommendations</i>	<i>Climate strategy</i>		<i>Yes</i>	<i>Climate risks</i>	<i>Sustainability Working Group</i>		<i>ESG recommendation</i>
Portugal		<i>Associated with the BIS Green Bond investment fund</i>	<i>Webinar</i>		<i>The banking sector's exposure to climate risk</i>	<i>Committee within the central bank</i>	<i>TCFD report</i>	<i>ESG report</i>
Singapore	<i>Multi-sector transition taxonomy and Net Zero Action Plan</i>	<i>Green Investments Programme (GIP)</i>	<i>Point Zero 2023</i>	<i>Yes</i>	<i>Sustainability Report</i>	<i>Singapore Sustainable Finance Association</i>	<i>Climate reporting</i>	<i>"Gprnt" digital platform</i>
Spain	<i>Supervisory requirements</i>	<i>Climate considerations in the portfolio</i>		<i>Yes</i>	<i>Green regulation</i>	<i>Working Group</i>	<i>TCFD report</i>	
Sweden		<i>Carbon footprint consideration</i>	<i>Climate change conference</i>	<i>Yes</i>	<i>Climate change report</i>			
United Arab Emirates	<i>Sustainable Finance Statement</i>	<i>Sustainability aspects in the portfolio</i>	<i>Climate conference under the auspices of the COP28</i>	<i>Yes</i>	<i>Innovative technologies in sustainable finance</i>	<i>Sustainable Finance Working Group</i>		<i>ESG supervision</i>
United States	<i>Managing climate risks</i>		<i>Climate conference</i>	<i>Yes</i>	<i>Measuring the climate risk exposure of the financial system</i>	<i>Committee on Climate Risk</i>		<i>Risk management proposal</i>

*Note: Items in italics are new measures compared to those in last year's report*

## 4.2 NGFS RECOMMENDATIONS AND RELATED MEASURES BY THE MNB

The MNB's actions are in line with the recommendations of the NGFS, one of the main international organisations promoting the greening of central banks. International best practice in the area of green financial regulation can be found in the proposals and recommendations of the NGFS for action to green the financial system (already explained in Section 4.1). When introducing its measures (Table 4), the MNB has tailored its programmes with these in mind.

### In September 2023, the MNB extended the eligibility for the Green Preferential Capital Requirements Programme

Thanks to the extended time limit, banks will be able to apply the reduced capital requirements for five years – up until 2030 – for green loans disbursed by 31 December 2025. The central bank also expanded its green loan purposes to promote energy efficiency, the modernisation of energy networks, energy storage, greener district heating and a wider use of renewable energy. For more information on the extended programme, see Section 3.1.1.



Last year, the MNB issued its **Green Recommendation for the insurance sector**. On the one hand, the Recommendation is intended to facilitate the identification, measurement, management and disclosure of climate-related and environmental risks by insurers. On the other hand, it sets out the MNB's expectations for the implementation of environmental sustainability aspects in the business activities of insurers. In addition, the Bank expects the Recommendation to increase the predictability of the application of the law and to promote the uniform application of the relevant legislation. For more details on the recommendation, see Section 4.4.



During the year 2023, the MNB launched its **Green Finance Product Finder**. The website aims to promote green investment opportunities, facilitate access to information and increase the comparability of green financial products. Visitors can find green investment funds, green asset funds linked to unit-linked insurance and green offerings from voluntary pension funds.

**Table 4**  
NGFS recommendations and MNB measures

#	Proposal	MNB measures
1	Integrating climate change-related risks into macro- and micro-prudential supervision	Conducting long and short-term <b>climate stress tests</b> for the domestic banking sector
		Climate risk stress testing and climate risk preparedness analysis of insurers' assets
		Update of the MNB's Green Recommendation, setting specific deadlines for credit institutions to meet supervisory requirements
		Publication of a <b>Green Recommendation</b> for the insurance sector
		Conducting an analysis of the entire Hungarian banking sector in the context of compliance with the MNB's Green Recommendation ("Recommendation on climate-related and environmental risks")
		Conducting an analysis based on a comparison of bank's exposures to transition risks and individual preparedness levels
	Extension and expansion of the Green Preferential Capital Requirements Programme	
2	Integrating sustainability elements into the management of the central bank's own portfolios	Construction of a dedicated green portfolio
3	Overcoming data gaps	Expecting the reporting of green data as part of Green Preferential Capital Requirement Programmes

4	Developing awareness and relevant knowledge, and encouraging technical assistance and knowledge sharing	Launching of the Green Finance Product Finder to inform investors
		Continuing to publish the methodology for long- and short-term climate stress tests
		Supporting signature of the UN Principles for Responsible Banking
		Continuation of university education and research programs, banking and capital market courses
		Publication of green financial reports, articles and studies
		Organising international green conferences
5	Achieving sound disclosures on climate change-related and environmental risks that are in line with the international approach	Publication of the MNB's climate-related financial disclosure (TCFD report)
		Publication of the MNB's Green Recommendation for credit institutions and the insurance sector, with a chapter formulating disclosure requirements
		Supporting disclosure obligations under the SFDR by means of a management circular
6	Supporting the development of a taxonomy	Simplified application of EU green taxonomy under preferential capital requirement programmes

*Note: Items in italics are new measures compared to those in last year's report.*

**Box 9**

**MNB's evaluation based on the Green Central Banking Scorecard**

**The MNB has assessed its own green initiatives based on the public methodology of Green Central Banking.**

Created by Positive Money and Green Central Banking, the Green Central Banking Scorecard is a scoring system for central bank sustainability. The Scorecard scores and ranks the central banks of the G20 countries that comprise the world's largest economies on the basis of their green policies and programmes. The Magyar Nemzeti Bank – which is not a G20 central bank – has decided to take stock of its own sustainability efforts. The assessment was checked and validated by the creators of the Scorecard.

**The MNB's performance in sustainability is outstanding by international standards.**

According to the assessment, the MNB is ahead of the G20 central banks overall in terms of sustainability actions. In recent years, the Magyar Nemzeti Bank has paid particular attention to sustainability and the green transition. Recognising that climate change affects its primary and secondary mandates alike, the MNB has also greened its monetary policy and supervisory policy. It has crafted a Green Toolkit Strategy, including the Green Home Programme and the Green Mortgage Bond Purchase Programme in order to modernise the housing stock. The MNB has also greened its collateral management framework and most recently published its sustainable and responsible investment charter. Moreover, as part of its supervisory activities, the MNB carries out stress tests and issues recommendations to financial sector participants. In addition, the supervisory branch of the MNB has introduced unique programmes such as the Green Preferential Capital Requirements Programme.

**The survey also provided an opportunity for self-reflection and the assessment of room for improvement.**

The MNB's Green Central Banking Scorecard helps to map where the central bank is now and where it wants to go on the green path. In addition to strengths, areas for improvement and potentials for development were identified. An important result and lesson of the survey is that central banks can learn a great deal from each other and from each other's programmes. Sharing knowledge and leading by example is therefore of paramount importance.<sup>111</sup>

<sup>111</sup> <https://greencentralbanking.com/2024/01/16/hungary-green-monetary-policy-scorecard-mnb/>

## 4.3 INTERNATIONAL DEVELOPMENTS IN 2023

**In 2023 the EU has continued to combat global warming in the regulatory field.** In the spirit of sustainable growth and the transition to a climate-neutral economy, it set standards for environmentally sustainable bonds with the adoption of the European Green Bond Regulation in 2023. Regulation (EU) 2023/2631 on European Green Bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds<sup>112</sup> sets out uniform requirements from 21 December 2024 for bond issuers wishing to use the designation “European Green Bond” (EuGB) for their environmentally sustainable bonds.

**European green bonds will be aligned with the EU taxonomy for sustainable activities.** Environmentally sustainable bonds are a key instrument for financing investments in green technologies, energy and resource efficiency, sustainable transport infrastructure and research infrastructure. For a bond to qualify as a European Green Bond, the proceeds of the issue must be used in accordance with the Regulation. The proceeds from European Green Bonds should be used to finance economic activities that are environmentally sustainable and in line with the environmental objectives set out in the taxonomy regulation or contribute to the transformation of the issuer’s activities so that they can fulfil the criteria in order to become environmentally sustainable. Investors will be informed of compliance with taxonomy requirements by independent opinions from external reviewers, which will also help to discourage greenwashing.

**The evolution of the disclosure regime was extended with a new chapter in 2023.** In the financial services sector, the Regulatory Technical Standards (SFDR RTS) of the well-known EU SFDR Regulation<sup>113</sup> became applicable from 1 January 2023<sup>114</sup>. Financial market participants are required to report on the sustainability features of their products in accordance with the numerous substantive and formal requirements of the Delegated Regulation. For the first time, institutions published in their annual report the results of their adverse impacts on sustainability

factors in the template defined by the SFDR RTS, using the mandatory PAI<sup>115</sup> indicators (e.g. carbon footprint, GHG intensity, accident rate). For green financial products, pre-contractual disclosures already specify which sustainability indicators are used to measure the environmental or social characteristics to be promoted and the achievement of the sustainable investment objective. With the templates to be used, it is possible to find out the minimum percentage of a financial product that is green or sustainable and the percentage of investments that comply with the EU Taxonomy Regulation<sup>116</sup>. The same information can be found in the annual reports of these financial products, i.e. actual results as compared to the plans specified in the prospectuses.

**The mandatory application of the SFDR RTS has clearly been a big step forward in increasing transparency.** However, this is by no means the end of the list of regulatory measures. Section 3.2.5 of the MNB Green Finance Report 2022 provided an insight into the sustainability strategies most commonly applied by green financial products, of which ESG integration/assessment appears to be the most important element. However, a problem with the new market service is that the methodology used for the rating of investments is not clear. In a previous market consultation<sup>117</sup>, ESMA assessed ESG rating practices in the EU and one of the main findings was that there is a lack of transparency on how ESG scores are developed and how different environmental, social and governance factors are weighted. It is common for issuers to receive different ratings from ESG data providers, which may undermine the credibility of the ESG rating and may also be misleading for consumers. In order to strengthen investor confidence in sustainable financial products, the European Commission proposed a regulation on ESG rating activities in June 2023, the content of which is described in more detail in Section 4.5 of this Report.

**The CSRD Directive requires companies to publish sustainability reports.** This will have to be done in a uniform format for the first time from 2025. On 1 January 2024, the Corporate Sustainability Reporting Directive (CSRD<sup>118</sup>) came into force, replacing the rules introduced by the

<sup>112</sup> Regulation (EU) 2023/2631 of the European Parliament and of the Council

<sup>113</sup> Regulation (EU) 2019/2088 of the European Parliament and of the Council

<sup>114</sup> Commission Delegated Regulation (EU) 2022/1288

<sup>115</sup> Principal Adverse Impact

<sup>116</sup> Regulation (EU) 2020/852 of the European Parliament and of the Council

<sup>117</sup> ESMA publishes results of its Call for Evidence on ESG ratings, ESMA, 2022

<sup>118</sup> Directive (EU) 2022/2464 of the European Parliament and of the Council

Non-Financial Reporting Directive (NFRD<sup>119</sup>), which had been in force previously. The CSRD Directive sets new expectations for sustainability reporting. The regulation is intended to ensure that companies communicate sustainability information in a transparent and comparable way, encouraging them to behave more sustainably. Initially, from 2025, the new regulation will only affect large companies that are considered to be public-interest entities for their activities in the financial year 2024. From 2026 the CSRD will cover all large companies, and from 2027 all small and medium-sized enterprises (SMEs) that are considered to be public-interest entities. At EU level, around 50,000 companies will be affected. To ensure the comparability of reporting, the European Financial Reporting Advisory Group (EFRAG) has developed a set of general disclosure requirements for the environmental, social and governance dimensions, which form the European Sustainability Reporting Standards (ESRS). The delegated regulation on the completed ESRS<sup>120</sup> was adopted in December 2023. The ESRS standards developed so far are sector-neutral. Sector-specific reporting requirements are being developed but are not expected to be implemented until mid-2026 at the earliest.

**The European Banking Authority (EBA) continued to play a very active role in 2023.** In February 2023, the EBA launched a survey of EU credit institutions in response to a Call for Advice from the EU Commission, requesting information on green loans, mortgages, and related practices by banks. More than 70 banks participated in the survey and the results were published by the EBA in December 2023<sup>121</sup>. The main findings of the report included that green loans still represent a low share of

banks' activities and that there are differences in the way banks identify green loans. Based on the results of the survey, the EBA also made recommendations to the EU Commission, including the need for common definitions of green loans and the need to specify the conditions under which a product can be green-labelled, in order to provide customers with adequate information.

**The European Banking Authority has also been active in other regulatory areas.** In October 2023, the EBA published its report on the role of environmental and social risks in the prudential regulation of credit institutions and investment firms<sup>122</sup>. In the report, the EBA recognises that environmental and social risks have an impact on the credit, market and operational risks of credit institutions and investment firms. It proposes that stress tests should cover environmental risks, that external credit rating agencies should take environmental and social factors into account in their ratings, and that supervisory reports should be supplemented with information allowing the measurement of the concentration of such risks. However, the EBA does not currently support the introduction of preferential risk weights for green loans or punitive risk weights for brown loans, unless they are justified by actual risk assessments.

**The EBA also looked at the current situation and potential risks of greenwashing.** A report on this was published in May 2023<sup>123</sup>. For banks and investment firms, greenwashing is first and foremost a reputation risk, but it also jeopardises the ability to achieve the objectives set by regulation. Although greenwashing is not yet a serious problem, steps should be taken to avoid it in the future.

<sup>119</sup> Directive 2014/95/EU of the European Parliament and of the Council

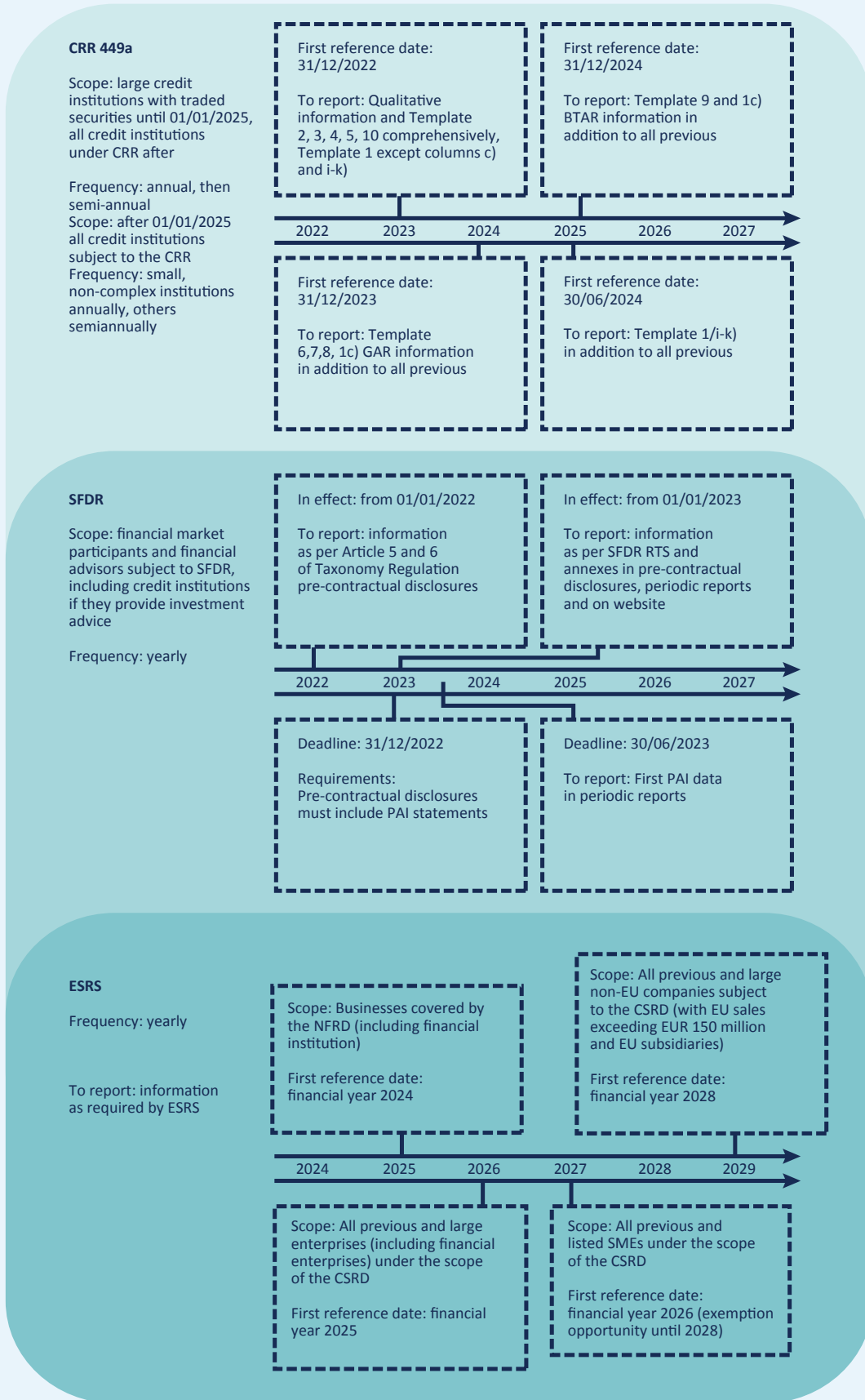
<sup>120</sup> Commission Delegated Regulation (EU) 2023/2772

<sup>121</sup> The EBA proposes a voluntary EU green loan label to help spur markets

<sup>122</sup> The EBA recommends enhancements to the Pillar 1 framework to capture environmental and social risks

<sup>123</sup> EBA progress report on greenwashing monitoring and supervision

**Chart 4.1**  
Sustainability disclosures under further EU legislation



Source: MNB

## 4.4 DOMESTIC DEVELOPMENTS IN 2023



From 2023, credit institutions will have to meet new requirements for compliance with the **Green Recommendation**. The new provisions of the Green Recommendation on environmental risk management systems of credit

institutions<sup>124</sup> entered into force on 1 July 2023, enhancing the requirements imposed by the MNB on credit institutions in Hungary further with regard to climate change and environmental risks. The MNB also started to monitor compliance with the Recommendation as part of its supervisory activities from 2023 in the course of its comprehensive review of credit institutions.



In December 2023, the MNB issued a **Recommendation for the Hungarian insurance sector**. The Recommendation is intended to help insurers to identify, manage and disclose climate-related and environmental risks and to integrate

environmental sustainability considerations into their business activities. The Green Finance Report of the previous year reported on the main findings of a climate risk questionnaire in the domestic insurance sector, in preparation for the publication of a supervisory regulatory tool. Based on the findings of the survey, the MNB intends to provide guidance to Hungarian insurance companies on how to achieve a sustainability transition for a greener financial system.

**Climate change and changing environmental risks also pose serious challenges for insurers.** As the key risk managers of the economy, insurers are already experienced in interpreting, measuring and pricing environmental impacts and the risks they carry. However, the nature and severity of environmental risks may change at an accelerating pace due to climate change. At the same time, traditional risk models are less and less reliable in predicting expected claims with certainty; consequently, insurance risks are expected to increase. In this turbulent period, in line with its supervisory strategy the MNB supports domestic financial institutions in implementing the green transition and preparing for the risks posed by environmental anomalies.

The **MNB Recommendation is the first milestone in achieving climate neutrality and environmental sustainability in the insurance sector**. The main objectives of the document are to encourage domestic insurers to assess environmental factors and risks, to provide guidance on how to achieve sustainability in operations and to increase the predictability of legislation, thereby facilitating regulatory compliance. The expectations and good practices set out in the Recommendation can be grouped under four topics, namely:

- i. Expectations regarding the insurer's business model and strategy
- ii. Expectations regarding the corporate governance of the insurer
- iii. Expectations regarding the underwriting and risk management practices of the insurer (in particular with regard to the management of operational risk)
- iv. Expectations regarding the reporting and disclosure obligations of the insurer.

**Identifying and managing not only the risks but also the opportunities are key in dealing with climate change.** In terms of business model and strategy development, the short, medium and long-term risks arising from climate change and environmental degradation (over a time horizon of at least 10 years) present numerous opportunities. There is also a need to integrate wider environmental considerations into the business model and strategy of the insurer. Although these risks are not equally material for all institutions yet, managing them could become a prerequisite for profitability in the long term. The development of a comprehensive carbon neutrality plan, highlighted in the Recommendation as a good practice, and the adaptation of the UN's Principles for Sustainable Insurance could be a good starting point for economically and environmentally sustainable operations.

**In terms of corporate governance, it is essential that the employees with task related to the climate risks have well-defined responsibilities.** A governance system that considers the significant environmental and climate-related risks and assigns responsibilities in a consistent way across the company is needed. The key to successful internal governance is a well-informed administrative, management or supervisory body. This means that this

<sup>124</sup> Recommendation No. 10/2022 (VIII.2.) of the Magyar Nemzeti Bank on climate-related and environmental risks and the integration of environmental sustainability considerations into the activities of credit institutions

body has all the relevant data and analytical results and the knowledge to interpret the information in the business context of the insurer. The first recommended practical step on the road to a sustainability transition is the creation of a sustainability unit or, in the case of smaller institutions, the appointment of a responsible manager to spearhead and catalyse initiatives. Obviously, to ensure the necessary competences, it is also essential to provide employees with the right training and internal motivation (e.g. introducing sustainability-linked remuneration policies for senior workers).

**It is for risk management that the Recommendation sets out the highest number of expectations and principles.**

Operational risks are in particular focus. In order to be able to assess its exposure to climate change, an insurer should also assess the potential impact of climate change and environmental risks on its own operations, business continuity and availability of services. Once the relevant risks have been successfully identified, the resulting findings should be incorporated into its core processes, taking into account physical, transition and, an insurance specific risk type, liability risks. The key is to embed these results in the investment decisions of the institution, in addition to the insurance function. It is good practice for insurers – being experts in risk assessment and management – to share the knowledge they have acquired with their customers, thereby improving their resilience to risks (and hence, reducing the risks borne by the insurer). Furthermore, it is important that the insurer's collection of loss data should also cover losses incurred in relation to climate change in case they can be detected in the accounting records.

**The Recommendation calls for a double materiality perspective.** This means that for the sustainability transition, it is not enough to look at the consequences of environmental impacts on the company, but the company's own environmental impacts should also be considered. In addition to assessing the impact of the environment and climate change on insurers, it is therefore essential that insurers also assess their own environmental footprint and actively seek to reduce it on an ongoing basis. Accordingly, the Recommendation expects, for example, emission data<sup>125</sup> to be measured for Scope 1<sup>126</sup> and Scope 2<sup>127</sup> emissions. As the regulatory framework regarding sustainability and greening the economy tightens, the severity of legal and

reputational risks is expected to increase. A good practice to address these aspects may be to operate an environmental management system, which (if properly implemented and supported by quantitative performance indicators) can positively influence the external perception of the insurer, in addition to improving environmental performance.

**The last thematic chapter of the Recommendation addresses the disclosure and reporting obligations of insurers.**

Although the legal background for green and sustainability reporting is primarily determined by European legislation, in addition to drawing attention to these, the MNB sets out a number of general expectations in the context of disclosures. The guiding principle is that insurers should publish meaningful and understandable information for the market based on reliable data. In order to inform market participants about the sustainability transition and environmental performance of insurers, it is necessary to disclose climate-related and environmental risks relevant to the insurer's operations. A materiality analysis of risks should be carried out at least annually in a documented manner. It is also worth informing the market about how the sustainability transition is being assessed and leveraged by the institution, also how and to what extent the insurer's activities contribute to the achievement of environmental objectives.

**Currently, domestic insurers are working on a gap analysis as required by the Recommendation.**

On this basis, they should develop an ambitious but achievable action plan to meet the expectations of the Recommendation by 1 January 2025. During 2024, MNB experts will jointly evaluate the plans with the professional staffs of the insurance companies in the framework of bilateral discussions, and the institutions' questions regarding compliance with the expectations will also be discussed. Through these consultations, the MNB aims to help institutions develop a common understanding of supervisory expectations, to encourage them to pursue their sustainability efforts, and to closely monitor the domestic insurance sector's environmental risk exposures and resilience to the impacts of climate change.

**The ESG Act adopted in 2023 entered into force in Hungary on 1 January 2024<sup>128</sup>.**

In addition to imposing ESG reporting obligations on companies established in Hungary that qualify as public-interest entities and large companies that

<sup>125</sup> Detailed information on the scope of application is available in the GHG Protocol standards: <https://ghgprotocol.org/>

<sup>126</sup> Direct emissions from activities

<sup>127</sup> Indirect emissions related to purchased energy

<sup>128</sup> Act CVIII of 2023 on the rules of corporate social responsibility to promote sustainable financing and unified corporate responsibility with due consideration of environmental, societal and social aspects, and amending other related acts



meet certain thresholds in terms of their financial indicators, the Act also regulates the activities of the key players in the domestic ESG ecosystem. The legislation imposes due diligence obligations on the companies concerned in respect of sustainability. The Act also contains amendments to the provisions of other ESG-related legislation, including Act C of 2000 on Accounting. The amendments aim to lay the foundations for the obligation to disclose adequate and comparable sustainability information in line with the CSRD Directive, i.e. to regulate sustainability reporting<sup>129</sup>, and to encourage corporate governance taking into account ESG considerations.

**Companies subject to the Act are required to produce an annual ESG report on the fulfilment of their sustainability due diligence obligations.** The ESG report must be audited by an accredited ESG certifier. The company may also involve an ESG consultant registered by the Supervisory Authority for Regulatory Affairs (SZTFH) – the organisation appointed as the exerciser of the administrative authority – in the process of preparing the ESG report. The content of the ESG report in Hungarian will be regulated by a Decree issued by the President of the SZTFH during 2024. The ESG report will be uploaded in electronic form to the ESG management platform, which will be an electronic one-stop-shop.

**Companies should have ESG risk management systems in place.** The Act stipulates that the companies concerned must establish a risk management system and integrate it into all relevant business processes to screen out material social responsibility and environmental risks. Where justified by the risk analysis, preventive measures (e.g. requiring sustainability criteria in the selection of direct suppliers) should be implemented and their effectiveness evaluated. In addition to the above, companies are also required to maintain a complaints handling system that allows anyone to report social and environmental risks or breaches of their obligations.

**The Act also regulates the operation of ESG rating agencies.** ESG rating services will be engaged by companies either on a voluntary basis or to comply with the requirements of their business partners to rate their sustainability performance. The ESG rating is based on the information uploaded on the ESG management platform and may be supplemented with information from other authentic and publicly available databases. The methodology of the rating should be public.

**Companies that do not comply with the Act will be subject to fines.** The Act does not specify the amount of the fine as yet; it will be regulated later by a government decree, but from 2026, a fine may be imposed on companies that do not report or report in accordance with the regulations.

## 4.5 EXPECTED CHANGES TO GREEN LEGISLATION, RECOMMENDATIONS AND DATA REPORTING

**The European Commission's Platform on Sustainable Finance<sup>130</sup> plays a key role in laying the foundations for cooperation.** The platform enables close cooperation between a wide range of stakeholders from the public and private sectors. The platform was first set up in October 2020 with a two-year mandate, with this initial phase of the project ending in October 2022. The new composition of the platform was announced on 8 February 2023. Members and observers start their work on three topics to achieve key deliverables:

- I. advising on the usage of the EU taxonomy and the wider sustainable finance framework
- II. advising on the technical screening criteria for the EU taxonomy
- III. monitoring capital flows into sustainable investments.

**A recent project of the platform is the EU Taxonomy-Aligned Benchmarks (TAB).** The latest draft report of the benchmarks<sup>131</sup> was published in December 2023. Its creation was originally inspired by the success of the benchmarks aligned with the EU's Paris Directives and focuses on financing the future of a zero-carbon, environmentally resilient, circular and environmentally sustainable economy. The proposed guidelines aim to ensure flexibility and comparability in the methodologies of Taxonomy-aligned guidelines and to provide investors with an appropriate tool to align their investment strategy with the Taxonomy. It also aims to increase the transparency of the impact of investments, reducing the risk of greenwashing, and to support the development of innovative instruments to decarbonise and make investment portfolios greener. The underlying assets of the benchmarks are selected, weighted or possibly excluded in such a manner that the proportion of environmentally sustainable investments in the thus obtained benchmark portfolio is on a scaling, increasing trajectory, while the

<sup>129</sup> The report on information on sustainability issues (sustainability report) replaces the previous non-financial statement.

<sup>130</sup> Platform on Sustainable Finance - European Commission (europa.eu)

<sup>131</sup> Climate Change Taxonomy and the EU Regulatory Response: (europa.eu)

proportion of environmentally unsustainable investments follows a decarbonisation trajectory (i.e. continuously decreases).

**Individual investment benchmarks are not intended solely for financial purposes.** They also include specific targets for greening capital expenditure and the transition to a low-carbon economy. These benchmarks can serve as the cornerstone for passive investment strategies, as investment performance benchmarks in respect of low-carbon portfolios, as well as a tool for achieving policy targets in asset allocation strategies. The main users of the benchmarks are expected to be institutional investors that intend to place their assets under management in a portfolio that is resilient to the risks associated with climate change and the transition to a low-carbon economy.

**EU policymakers have decided to revise the disclosure templates under the SFDR RTS.** Shortly after the adoption of the RTS it became clear that further clarification and specification of the Regulation was needed, and the European Supervisory Authorities were given a mandate to review the Delegated Regulation. The progress report on the review was completed as early as January 2023, and subsequently it was submitted to public consultation<sup>132</sup>. Finally, by December 2023 the final report on the amendment of the Regulation was published<sup>133</sup>. In the report, calculation formulas and related definitions have been presented for the PAI indicators, and new indicators have been introduced. As a new section have been added to the templates for financial products promoting environmental and social features, investors will soon have an opportunity to get to know potential decarbonisation targets. Moreover, the Product Information templates have been simplified and the wording of the Regulation have been clarified. The draft regulation is currently awaiting adoption by the European Commission, which is still to be adopted by the rest of EU policymakers; therefore, the revised SFDR RTS is not expected to apply until 2025 at the earliest.

**In the future, ESMA will be able to authorise and supervise ESG rating companies.** As mentioned in the previous subsection, the European Commission proposed a regulation on ESG certification activities in June 2023. The proposal covers, inter alia:

- I. Authorisation and supervision of ESG rating providers by ESMA
- II. Minimum transparency requirements to the public on ratings methodologies and objectives and more granular information to subscribers and rated companies (e.g. weighting and separate assessment of E, S and G factors, presentation of indicators used, methodological description)
- III. Transparency of supervisory fees and requirements for fees to be fair, reasonable and non-discriminatory
- IV. Separation of business activities to prevent and manage conflicts of interest.

**Several trilogues have taken place on the draft regulation already.** Finally, in February 2024, the European Parliament and the Council reached a provisional agreement<sup>134</sup>. However, the formal adoption procedure can only start once the provisional political agreement has been adopted. The Regulation will become applicable 18 months after its entry into force.

**During 2023 the European Banking Authority prepared draft guidelines on the management of ESG risks<sup>135</sup>.** This document was published for public consultation in January 2024. The main message of the draft guidelines is that ESG risks should be integrated into the overall strategic planning and risk management processes of credit institutions, including the setting of internal capital and liquidity requirements, which should be underpinned by appropriate data collection, measurement, internal control processes and reporting. The guidelines will be finalised by the EBA in 2024 on the basis of the comments received.

**ESG aspects will also be included in the Capital Requirements Regulation.** The forthcoming amendments to Regulation (EU) No 575/2013 of the European Parliament and of the Council on prudential requirements for credit institutions (CRR) will set out a number of new tasks for the EBA. Among these, the EBA should assess, based on the data available, whether the specific prudential treatment of exposures related to assets or liabilities exposed to the effects of environmental or social factors should be adjusted. In this context, the EBA should also examine

<sup>132</sup> [Joint consultation on the review of SFDR Delegated Regulation](#), ESMA, 2023

<sup>133</sup> [ESAs put forward amendments to sustainability disclosures for the financial sector](#), ESMA, 2023

<sup>134</sup> [Environmental, social and governance \(ESG\) ratings: Council and Parliament reach agreement](#), European Council, 2024

<sup>135</sup> [The EBA consults on Guidelines on the management of ESG risks](#)

whether reliable and consistent ESG data are available and accessible for each exposure class. In order to carry out this task, the EBA launched a survey in January 2024 seeking comments from market participants on the availability of data<sup>136</sup>. The amendments to the CRR, which will come into force in January 2025, are also important because they include a number of definitions (e.g. environmental risk, physical risk, transition risk, social risk) that are essential to ensure that the right data are collected and analysed.

**It is not only the CRR that is affected by the integration of ESG considerations.** Directive 2013/36/EU of the European Parliament and of the Council on access to the activity of credit institutions and the prudential supervision of credit institutions (CRD) will also be amended, and Member

States will have to transpose these amendments into their national legislation by the end of 2025. The amendment to the CRD puts a strong emphasis on ESG risks. On the one hand, it requires institutions to manage climate-related risks, as well as risks from environmental degradation and biodiversity loss adequately. It also empowers supervisory authorities to take appropriate steps to enforce the above. Institutions need to consider not only current but also future impacts when developing their corporate governance systems and internal processes to manage ESG risks, as well as the strategies approved by their governing bodies. The amendments to the CRR and the CRD mainly include tightening of supervisory reporting, internal bank processes, scenario analyses, stress testing and disclosure obligations in relation to ESG risks.

<sup>136</sup> [The EBA seeks inputs from credit institutions on the classification methodologies for exposures to ESG risks](#)

# 5 Academic aspects of green finance

*At present, a financial institution in Hungary has to address climate change and manage the risks it may entail. With tightening regulation, there is a growing need for experts with green finance skills who can navigate the maze of regulatory changes. But no one becomes an expert overnight; it takes education and the support of education. Recognising this, the Magyar Nemzeti Bank is cooperating with several Hungarian higher education institutions to expand students' knowledge on green finance. In addition to university graduates, those with work experience should also be considered; with that in mind, the MNB also contributes to their further training, and it provides them the opportunity to broaden their knowledge.*

*Besides education, research is another cornerstone of development. The MNB believes that a breakthrough can only be achieved through research, and since 2021 it has been supporting domestic and international researchers for the results achieved in the field of green finance. To be effective in the combat against climate change, we need to build our existing knowledge base continuously and make the right (green) financial skills available to a wide audience.*

## 5.1 THE MNB'S EDUCATION ACTIVITIES IN GREEN FINANCE

**The labour market exhibits increasing demand for green finance experts year after year.** The MNB's Green Programme places particular emphasis on reinforcing a green approach to financial literacy among young people, including environmental aspects in addition to sustainable finance. In this context, the MNB's educational activities focus on supporting green finance courses that are tailored to the training profile of the partner institutions.

**The MNB cooperates with a number of Hungarian universities with an active focus on education.** These universities are the Budapest Metropolitan University (METU), the Neumann János University (NJE), the University of Szeged (SZTE) and the University of Debrecen (DE). In addition to the MNB experts, the courses are taught by the universities' own lecturers and other internationally recognised experts.

1. At the METU, interested parties can now enrol in two specialised training courses, to which MNB experts are actively contributing. The Financial Regulation and Supervision Specialist Training is a two-semester, part-time programme, available in the university's courses since September 2022. This training, which addresses specific issues of the supervision of financial institutions, also covers the topic of green finance. The Sustainability Management specialisation can also be completed in two semesters; it started for the first time in autumn 2023. This programme provides students with an insight into the theoretical and practical context of all three pillars of sustainability (environmental, social and governance).

2. Starting from the spring semester of the 2020/2021 academic year, two interrelated courses are available for students at the NJE Faculty of Economics. By completing a foundation course in Sustainable Finance, students may gain a broad knowledge of the correlations between sustainability, economy and finance. Students who have successfully completed the foundation course can continue their studies in the small-group, workshop-focused Sustainable Case Studies course.

3. The MNB also collaborates with the Research Centre of the Faculty of Economics and Business of the University of Szeged and the Institute of Finance and International Economics in providing training in the economics of sustainability. In the autumn semester of the 2023/2024 academic year, a new English language master's programme was launched with the participation of MNB experts, entitled Green Finance and ESG reporting.

4. The University of Debrecen launched a course entitled Sustainable Economics of the Future in the autumn semester of the 2023/2024 academic year, with the aim of introducing students to the pillars of long-term, sustainable economic growth: financial, social, real economic and environmental sustainability.



**In addition to the academic partners, the banking and finance courses of the Budapest Institute of Banking (BKF Fenntartó Korlátolt Felelősségű Társaság) are also available at the university.** A key part of its portfolio is the [Qualified green finance expert](#) course, which provides an excellent opportunity for professionals with significant work experience and an

interest in sustainability to expand their knowledge further. Experts from the MNB also participate in teaching the course.

## 5.2 UNIVERSITY RESEARCH COLLABORATIONS

In addition to its educational activities, the MNB cooperates mainly in research with the Budapest University of Technology and Economics (BME). The Green Finance and Green Economy workshop has been operating at the university since 2019, in the spirit of the MNB–BME cooperation. The objective is to help identify areas where the financial world can contribute to green goals. The workshop’s strategic priority projects for 2023 are presented below.

- *Energy independence programmes.* Inflation and financial stability effects on the MNB’s mandates have increased the importance of energy independence and locally produced energy in recent years. To support these two objectives, the MNB and the Zero Carbon Centre of the BME have developed two action plans in a workshop. The focus of the work was on the design of programmes that would give priority to energy independence and renewable electricity penetration in Hungary, and their detailed technical and economic analysis. The *GreenGas Action Plan* proposed the implementation of four programmes that, on a 2021 base year basis, could result in a total of 2 billion cubic metres of imported natural gas being permanently replaced in a cost-effective manner in the second half of the 2020s. In addition, the proposals of the *GreenPower Action Plan* will enable Hungary to reach, by 2028 already, the 2040 renewable electricity generation targets set in the current energy strategy.
- *Resilient and sustainable water management – The relationship between climate change and land use in the Zala River catchment, expected trends and proposals for change.* The project is intended to integrate the latest research results from different disciplines, and to present and evaluate the development of water resources, the role of water in climate regulation, and nature-based solutions for water conservation in the Zala catchment. The new methodology outlined in the workshop study will help identify critical, relatively small areas where well-targeted land use change interventions may have a significant impact. The methodology is based on a combination of the latest research results and geospatial information tools. It has been applied to the Zala catchment to produce a map showing the locations of land use conflicts and proposed solutions to environmental challenges. The methodology developed for the Zala River catchment offers the possibility to be easily applied to other domestic, also hilly river catchments or possibly international ones.
- *Resilient and sustainable water management – Preparation of a risk impact map for water utility networks for a selected sample area.* The frequency of extreme weather events will continue to increase in the future, while water utility networks are significantly outdated, and this combination may result in damage at the level of the national economy. The workshop was designed to develop, in addition to the traditional procedures, a new, innovative, digital, geospatial decision support system capable of mapping the impact of water restrictions and water shortages, assisting operators, municipalities and state bodies in supporting their water utility development plans. The water supply safety investigation was carried out in the Törökbálint area.
- *Develop a domestic voluntary carbon market mechanism.* In the framework of the BME Workshops, the MNB has commissioned the Zero Carbon Centre within the university to investigate the possibility of setting up a “domestic crediting scheme” to facilitate the financing of carbon removal projects in Hungary. International crediting schemes are already in place in the so-called voluntary carbon markets, but they have stimulated few projects in Hungary. The resulting study also provides an overview of the Carbon Removal Certification Framework (CRCF) currently under preparation in the European Union.
- *Mobility sub-workshop: Sustainable transport solutions.* Within the framework of the project, a web application was developed that supports the mobility decisions of MNB employees working in and around Budapest and takes into account sustainable transport solutions. When planning a trip, different modes of transport can be compared on the basis of four indicators: travel time, cost of the trip, environmental impact and impact on the traveller’s health. MNB employee commuting data can be used to generate statistics that can help the Magyar Nemzeti Bank to better analyse commuters’ travel patterns, measure CO<sub>2</sub> emissions and propose ways to motivate employees to use sustainable transport modes.
- *Energy sub-workshop: Research and educational objectives of rooftop laboratory development.* The objective of the sub-workshop was to establish a solar rooftop laboratory at the Department of Energy Machines and Systems of the BME. The rooftop lab was set up with an educational development focus, allowing students to deepen their practical knowledge by examining modern renewable energy production and storage technologies in practice. With the help of the laboratory, the simulation

results of the energy production and storage models can be validated experimentally. The measurement system is planned to be integrated into university education from the spring semester 2024.

- *Sustainability forum and models for colleges.* Within the framework of the sub-workshop, the Sustainability Forum of Colleges was organised by the staff of the MNB and the BME, and the students of the Tibor Liska College with the professional support of the Budapest Metropolitan University. This initiative addressed the Hungarian student community on the topic of sustainability and gave students the opportunity to showcase their own innovative, sustainable solutions and present their analyses and research in a competition.
- *Processing and dissemination of a discussion paper on sustainable economics.* The sub-workshop aims to produce a university teaching manual based on the textbook “New Economics for Sustainability” (it’s shortened version is available in English at the webpage of the MNB as New Sustainable Economics - Global Discussion paper). The handbook is intended to promote the theoretical and practical teaching of the new sustainable economics at Hungarian universities, to deepen the conceptual framework and the data and arguments presented in the sourcebook and hence, to contribute to the strengthening of the sustainability approach in Hungarian higher education.

**In 2024 the MNB continues to support the sustainability turnaround with more research.** One of the action points of the GreenGas Action Plan was to increase the use of geothermal energy. In cooperation with the ZKK, the MNB intends to define the measures needed to exploit domestic geothermal assets beyond their current level in order to reduce energy imports. Another envisaged study would examine Hungary’s sustainability performance against the 17 Sustainable Development Goals (SDGs) set by the UN, broken down by several regions. In addition to sustainability benefits, the results may support economic policy decisions and the targeting of sustainability investments.

### 5.3 SCIENTIFIC AWARDS AND RESEARCH FUNDING

**Since 2021, the MNB has launched the annual Green Finance Science Awards and the Green Finance Research Initiative.** To encourage the promotion of environmental sustainability, and to show its appreciation for Hungarian and non-Hungarian professionals who have achieved outstanding green finance research, the MNB established

the Green Finance Science Awards in 2021 and the Green Finance Research Initiative. In 2023 the MNB launched two award categories and a call for research initiatives as part of the initiative to establish a tradition. The decision to grant the International Green Financial Lifetime Achievement Award was taken by the Governor of the MNB after a professional preparation. In the other categories, the Green Finance Academic Council (composed of academics and individual members of the Monetary Council) decided on awarding the prizes following an open nomination and the submission of a research plan. With the exception of the Lifetime Achievement Award, the award ceremony took place in the framework of the MNB’s Green Finance Conference.

**The International Green Finance Lifetime Achievement Award is a special element of the family of awards, as it is granted for outstanding and pioneering work on a global scale.** The International Green Finance Lifetime Achievement Award may be granted to a non-Hungarian professional who has contributed to the development of the scientific study of green finance with internationally relevant and globally significant research achievements. In 2021 the Lifetime Achievement Award went to Naoyuki Yoshino, Professor Emeritus at Keio University in Tokyo, and in 2022 to Sean Kidney, Co-Founding CEO of the Climate Bonds Initiative and Professor at the Centre for Sustainable Finance at SOAS University of London.



**Last year, the International Green Finance Lifetime Achievement Award was awarded to Dr. Ma Jun, Founder and President of the Institute of Finance and Sustainability (IFS) based in Beijing.** Ma Jun is Chairman of

the Green Finance Committee of the China Society for Finance and Banking, Co-Chairman of the G20 Sustainable Finance Study Group, Chairman and President of the Hong Kong Green Finance Association and President of the Beijing Green Finance Association. Unlike in previous years, in 2023 the award ceremony for the Lifetime Achievement Award took place at the Budapest Eurasia Forum.

**The 2023 Talent Award went to Emilia Németh-Durkó for her outstanding research work.** Emilia Németh-Durkó is Assistant Lecturer at the Department of Corporate Finance, Corvinus University of Budapest (BCE). Her main research interests are green bonds and investments, and the environmental Kuznets curve. She examines sustainability directly from a financial perspective. The Green Finance

Science Talent Award is presented to an outstanding green finance researcher of Hungarian nationality under the age of 41, based on their publication activity in recent years.

**Once again in 2023, the Green Finance Scientific Research Initiative was open for applications with a research plan. In the third call of the Research Initiative, four research proposals were awarded.**

- I. The 1<sup>st</sup> place was awarded to Edit Lippai-Makra and Regina Bodó for their research plan on the impact of the European Union's Sustainable Finance Action Plan on the sustainability disclosure of Hungarian banks. The goal of their research is to examine how the Corporate Sustainability Reporting Directive (CSRD) approved by the Council in 2022 may affect the sustainability disclosure of Hungarian banks. The research team consists of researchers from the University of Szeged.
- II. The 2<sup>nd</sup> prize was awarded to the ESG Finance research group of the University of Pécs. In their research, they formulated a stakeholder protocol to improve the ESG

knowledge and awareness of domestic SMEs. Their objective is to identify the ESG exposure and perceived and actual ESG performance of SMEs, highlighting the financial and non-financial drivers of ESG performance.

- III. Helena Naffa and her research team won 3<sup>rd</sup> place for their research plan on the impact of environmental materiality factors on the financial performance and creditworthiness of businesses. Their research is intended to explore the relationship between the main adverse impacts generated by companies on climate change and biodiversity and their financial performance and creditworthiness. The research team consists of researchers from Corvinus University of Budapest.
- IV. The Special Prize of the Green Financial Scientific Research Initiative competition was awarded to Emilia Németh-Durkó for her research plan on banks in the service of the green transition. The objective is to identify the effects on banks' performance and to provide information on the expected profitability and default risk rates associated with green lending.

#### Box 10

##### Participation in technical assistance programmes

**The European Central Bank's (ECB) Working Group on Central Bank Cooperation within the International Relations Committee implemented a project aimed at the convergence of the Western Balkans region in 2019–2021, to which the MNB actively contributed.** The programme focused on the capacity building of the central banks and supervisory authorities of candidate and potential candidate countries for accession to the European Union by sharing good practices and experiences from Member States. Beneficiaries of the EU project, which had a total budget of around EUR 2 million, included Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia. In view of the success of the project, the European Commission has initiated a new regional programme for the period 2022–2025, which will allow for the implementation of a number of training events, seminars, high-level workshops, internships and bilateral cooperation programmes (e.g. study trips). The MNB continued to play an active role in the EUR 3 million project with Deutsche Bundesbank (DBB) acting as project coordinator.

**In the framework of the EU project aimed at the convergence of the Western Balkans region, in 15–17 November 2023 Banca d'Italia held a seminar in Rome entitled "Financial Markets and FX reserve management – Focus on green and sustainable finance".** In addition to the host Italians, experts from the ECB, the Austrian, Belgian and Dutch central banks and from the MNB provided technical content. The presentations by MNB experts covered the MNB's Green Programme and the experiences of the climate stress test. The seminar was attended by central bank experts from the six Balkan countries.

**In June 2023 the MNB launched its technical assistance programme "Stability and Innovation".** Through its international network of contacts, the Magyar Nemzeti Bank has regularly hosted professional training and knowledge-sharing events for central bank experts and managers from our partner countries. Through the MNB's own technical assistance programme, professional training and knowledge-sharing events – which had been demand-driven in the past – were integrated into a well-structured framework, thereby enabling the MNB to share good

practices, strengthen its network of contacts abroad and promote its own professional solutions and approach. The programme offered four seminars last year, covering both traditional central bank functions and innovations emerging in the world of finance.

**The technical assistance programme arranged in 14–16 June 2023 commenced with a seminar entitled “Green and Sustainable Finances – Introducing the MNB’s Green Programme”.** The three-day programme was hosted by the MNB Supervisory Centre. Experts from the Hungarian central bank delivered presentations in the topics of the three pillars of the MNB’s Green Programme. The specific topics covered were the following: sustainability in the MNB’s supervisory activities, sustainability in the MNB’s monetary policy, reserve management and macro-prudential supervision, sustainability in the MNB’s own activities, and the MNB’s research and education programmes. 20 participants representing a total of 12 central banks arrived in Budapest from the Balkans, the Caucasus, the Middle East, Central and East Asia.



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# Main acronyms and abbreviations

BCRI – Bank Carbon Risk Index

BNEF – Bloomberg New Energy Finance

COP28 – UN Climate Change Conference

CPRS – Climate Policy Relevant Sectors

CRD – Capital Requirements Directive

CRR – Capital Requirements Regulation

EBA – European Banking Authority

ECB – European Central Bank

UN – United Nations Organisation

ESG – Environmental, Social and Governance

FSB – Financial Stability Board

IEA – International Energy Agency

IMF – International Monetary Fund

MFAR – Mortgage Funding Adequacy Ratio

NFRD – Non-Financial Reporting Directive

NGFS – Network for Greening the Financial System

BGS – Bond Funding for Growth Scheme

OECD – Organisation for Economic Co-operation and Development

OMSZ - National Meteorological Service

SFDR – Sustainable Finance Disclosures Regulation

TCFD – Task Force on Climate-related Financial Disclosures

UNEP FI – Finance Initiative of UN Environment Programme

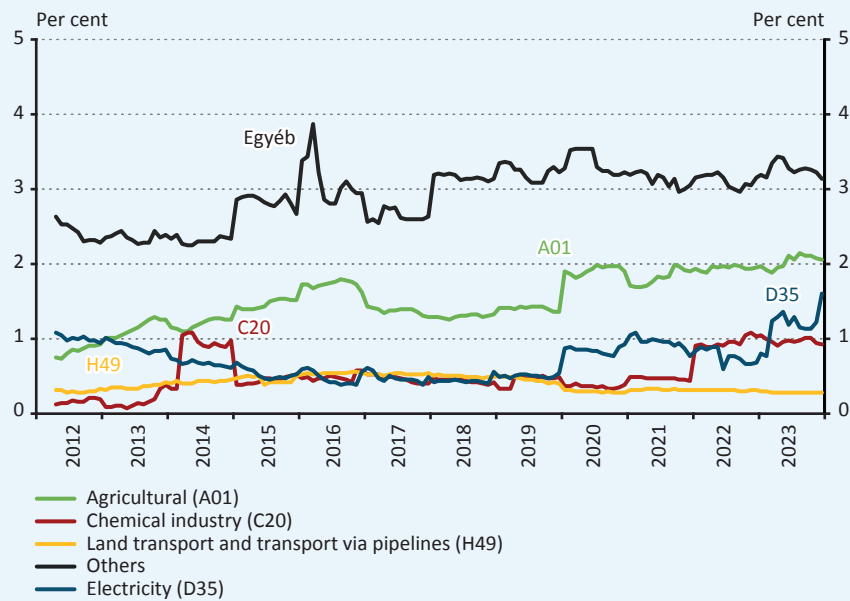
GHG – Greenhouse gas

ZKK – Zero Carbon Centre

GHP – Green Home Programme

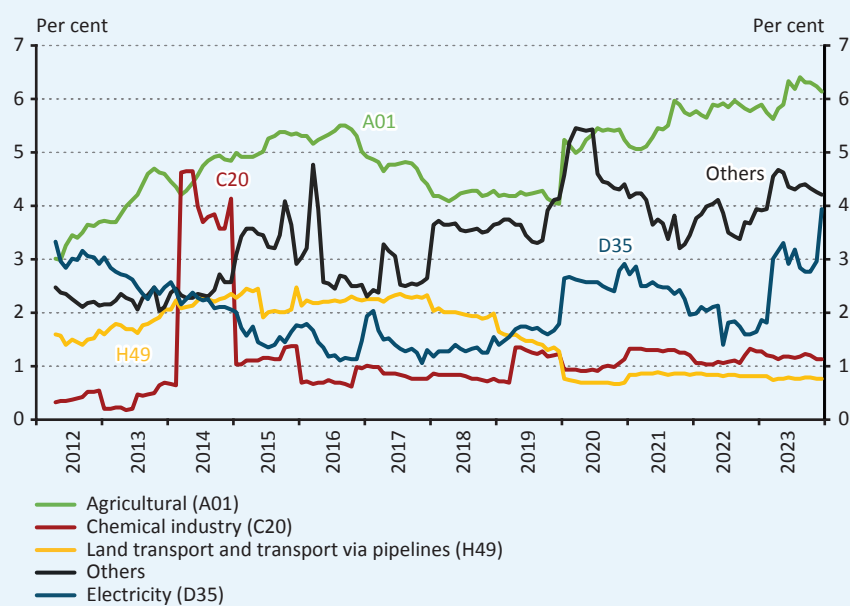
# Appendix

**Appendix 1**  
Monthly sectoral BCRI values (Linear weighting)



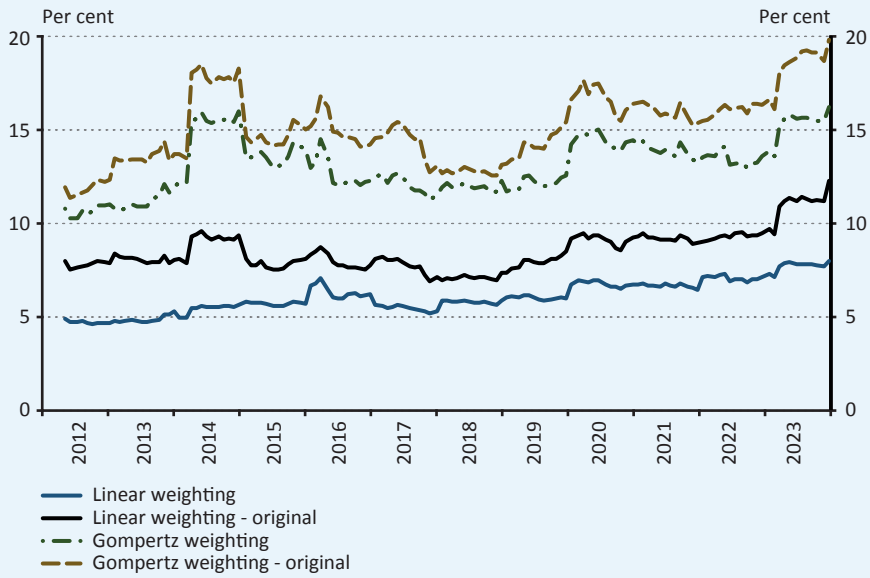
Source: MNB

**Appendix 2**  
Monthly sectoral BCRI values (Gompertz weighting)



Source: MNB

**Appendix 3**  
**Monthly BCRI values of the banking system – based on the original and the revised methodology**



Source: MNB

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# Mária Telkes – The Sun Queen

(1900 – 1995)

Little known in her native Hungary, she is called the ‘Sun Queen’ in the United States of America, where she spent most of her life. Perhaps her best-known patent is the first ‘solar house’ with a solar heating system.

Mária Telkes was born on 12 December 1900 in Budapest. Her father was Aladár Telkes, a bank director. She was the eldest of eight siblings. After graduating in mathematics and physics, she worked as an assistant to Professor István Ribáry and obtained her PhD. In 1924, the family was visited by her uncle, Ernő Ludwig, who was the Hungarian consul in Cleveland. This encounter brought a turning point in the life of Mária Telkes, who moved to America at her uncle’s invitation. She began her career in 1925 in the research laboratory of the Cleveland Institute of Biophysics. At the institute, they studied the radiation of brain cells. Mária Telkes built an electric camera to measure the infrared radiation of brain cells.

In 1939 she moved to Boston, where she continued her career as a teacher and researcher at the Massachusetts Institute of Technology (MIT). She focused mainly on researching the potential of solar energy. She joined the Solar Energy Research Project with the design of the Dover Sun House funded by the American industrialist Godfrey Lowell Cabot. Six experimental solar houses were built with the 650,000 dollars donated by Cabot. Mária Telkes became the head of the research group in 1940. She is credited with the discovery of a chemical process to store solar energy.

Mária Telkes has filed several patents for the use of solar energy. Her most successful invention was a solar-powered seawater desalination system for the US military. The patent was followed by mass production: in the Second World War, every pilot was equipped with the life-saving device she had developed.

She also designed a solar-powered meat fryer, which became particularly popular in India, where the number of hours of sunshine is high. Again, the success of the invention was guaranteed by the simple operating principle and the low price of the device.

She published more than 100 scientific papers, had 39 patents linked to her name (the last one registered at the age of 90), and received 12 international awards (including that of the US Office of Scientific Research and Development). She also worked as a university lecturer and later as a consultant to large corporations, and was involved in several government-funded naval and space research programmes. Since the oil crisis of the 1970s, the importance of her solar energy research has only increased.

She returned to Hungary in 1995. She died in Budapest in the same year, aged 95. She received a posthumous award: Together with physicist Dennis Gabor, she was inducted into the National Inventors Hall of Fame in 2012.

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